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AN INPUT-OUTPUT ANALYSIS OF THE NIGERIAN ECONOMY 1959-1960

by

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CHAPTER I

INTRODUCTION

The discipline of economics, in its unceasing search to approximate reality with theory and formula, has developed a number of highly refined tools in the past few decades. These tools, as they appear, are being used not only in academic speculation about the varieties of economics, but also in the serious business of using the discipline to plan and predict the future turn of economic events of a nation.

In a developed, self-sustaining economy, there are a variety of tools used to produce a more or less clearly defined amount of governmental intervention in, and manipulation of, business, industry, and agriculture. In some cases we may well wonder if any tools at all have been used in government action (here we must turn to politics, for which as yet there seems to be no set of formulae) but even in such cases decisions are to a certain extent based on the findings and predictions of "economics." However, we must be careful not to confuse economics with reality, as it is possible to say the same thing with two completely different theories and to predict opposite conclusions from the same set of assumptions; yet at no time will one stray beyond the bounds of developed economic theory.

In a developed economy the end-result of governmental intervention, based on economic reasoning, is likely to be benign and minimal. The situation in an underdeveloped or developing nation is likely to be much more serious. In such a country government is usually the biggest spender and the largest employer, and it is to government that the people look for the impetus of development. Government will supply or direct the flow of the scarce developmental inputs such as capital and manpower, government will also plan in more or less detail the manner in which

development will proceed. Here the role of economics is much more important and as a result, technique and theory must, of necessity, be well tested and proven. There is no room to test out new ideas, each mistake made by faulty use of economic planning tools will waste scarce resources and thus retard development. For this reason planning usually proceeds cautiously from a national income study and a series of capital budgets for the government. Beyond this point we run into another limitation on the use of economic tools, that of data. In the average case it is sparse and not particularly accurate, and is also expensive to collect. For this reason a developing country will spend a lot of its initial energy on the assembly of a decent set of national accounts. In terms of manpower involved, this is definitely the most productive of endeavours in the field of economics. The data required for the more sophisticated tools of analysis is usually beyond the point of diminishing returns and thus is not actively or enthusiastically assembled in the early stages of development planning.

Clark,[1] in his excellent paper on the process of planning in Nigeria, describes in detail the situation which faced the planners of that country, the sources and nature of information, and the actions eventually taken with available resources. Apart from studies in particular sectors or for particular industries, the only nationwide, economy-wide analysis available was the excellent National Income Study of Okigbo.[2] It was upon his figures that planning proceeded. Clark[3] also points out that among the next set of analyses that it will be useful for Nigeria to have for use in planning and prediction, is an

[1]Clark, P. B.,"Economic Planning for a Country in Transition: Nigeria;" in Planning Economic Development (E. E. Hagen, ed.), Irwin, Homewood, Ill., 1963.

[2]Okigbo, P. N. C., Nigerian National Accounts, 1950-1957.

[3]Clark, loc. cit.

input-output study. This in essence is the genesis and the justification of our present study.

Input-output analysis is a relatively new technique, being first developed by Leontief[1] in the 1940's and applied in detail to the United States economy by Evans and Hoffenberg[2] of the B. L. S. Since that time it has been applied to the economics of most developed nations and sparingly to the lesser developed ones. In its simplest form, the analysis is the direct complement of a national income study. Whereas national accounts look only at the value-added component of the economy, the input-output analysis is concerned with the data that the first analysis discards; the various sector transactions that relate to flows of goods and materials without additions of value. Value-added figures enter into an input-output presentation, but only as an external factor. It is essential, however, that national income figures exist for a given economy before an input-output analysis is undertaken. The results of each type of analysis, although complementary, are not similar. National income accounts indicate how big each sector is, and with prior assumptions as to growth and investment, one can predict what might happen in the future. Input-output analyses indicate, incidentally, how big, and directly, how involved; i.e. such an analysis will show how each sector affects other sectors and what happens when a given area of the economy undergoes change. Because the data involved in such a study have to be far more accurate than those of a national account, most input-output studies achieve only secondary importance in planning and are used to check consistencies of predictions based on National Income and general equilibrium analyses.

[1] Leontief, W., The Structure of the American Economy, 1919-1939, Oxford Press, 1951, second edition - "the keystone of input-output analysis."

[2] Evans, W. D. and M. Hoffenberg, Interindustry Relations Study for 1947, R. E S., May 1952.

This present study represents the first attempt to construct an input-output analysis for the Nigerian economy. It was undertaken at the suggestion of the Economic Planning Unit of the Ministry of Economic Planning of the Nigerian Federal Government in Lagos in early 1962. At that time, although the Development Plan for 1962-68 was well formulated, it was felt that an input-output analysis would be a useful tool to have as the process of planning continues in Nigeria. At the same time it was felt that a mere analysis would not be particularly useful as it would not be readily adaptable to revisions. Thus this work also undertakes the far more difficult task of explaining exactly how the analysis was undertaken and how it can be modified in the future as new data is available.

In the ideal case, an input-output study would need no revision at all, but the assumption upon which the analysis is based, that of a linear relation between inputs and outputs over all levels of production, tends to break down over time, particularly in countries where the economy is rapidly changing. In addition, the data used to generate the average input-output model is far from complete or accurate, so here also revisions must be periodically undertaken. It is perhaps these two deficiencies that have restrained the production of such analyses for the lesser developed nations, particularly in view of the very high ratio of manpower to usable output involved. It was only with the availability of excellent National Income accounts, and the understanding that this present work would have to be a working document, that the study was undertaken.

Support for the study came from Dr. C. L. Wilson of M.I.T. and from the M.I.T. Fellows in Africa program in which the author was a participant. Fieldwork was undertaken between March and August 1962, and a preliminary paper was

presented at Evian in August of that year.[1] Work on the actual analysis and the preparation of this document was undertaken at M.I.T. during 1962 and 1963.

In the following chapters we look first at the theory involved. Then we discuss the nature and quality of our information and the techniques employed in transforming raw data into flow accounts. Finally we present the detailed accounts developed and the matrices involved.

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[1] "An Application of Input-Output Methods to the Nigerian Economy," in Managing Economic Development in Africa (W. Hausman, ed.), M.I.T. Press, 1963.

CHAPTER II

THE THEORY OF INPUT-OUTPUT ANALYSIS

Before we turn to the actual study, it would be wise first to review briefly the theory involved in such an analysis. It is not our purpose to present a learned discussion; this has been done elsewhere many times by experts.[1] Rather we wish to present an outline of the ideas behind the analysis, in sufficient detail so that the reader, and the subsequent researcher, are aware of what is going on, but not to the extent of burdening them with interesting facts which are useless in the actual applied input-output process.

As mentioned in the introduction, input-output analysis looks at those elements of economic activity that are ignored by a national income account. National income is expressed roughly as: Production minus inputs of materials equals value added; and the sum of value added over the whole economy is national income. In equation form,

$$P - I = V \quad \text{and} \quad \Sigma V = \text{National Income}$$

Value added is composed of payments to the four primary factors of production: wages to labor, profits to entrepreneurs, interest to capital, and rents to land. In fact, this concept can be used as an alternate method of arriving at national income. In this sense materials have only the value that has been put into them by one of the primary production factors at a previous stage, thus to count them in national income each time they changed hands would

[1]The best reference to start with is Chenery, H. W., and Clark, P. G., Inter-industry Economics, Wiley, New York, 1959. This is an easily understood text that nicely bridges the gap between theory and practice. The excellent bibliography in it contains all the needed references for advanced reading in the subject.

involve double counting. Therefore great care is taken to ensure that all payments for materials (known as transfer payments) are omitted from the totals of national income. In addition, the compilation of national income discards the values of P and I, taking only their difference. It is with these unused figures that input-output analysis is concerned.

A national income study will indicate only how much each area of the economy is contributing to value; it says nothing about the interrelationships of the various sectors. It is a static set of values to which must be added assumptions about growth and investment in order for it to mean anything. Input-output analysis, on the other hand, produces, within the limitations of its own theory, a tool that can be used directly in predictions about a specific area of the economy as well as about the interactions of several different areas of the system. It is, however, a good deal more difficult to assemble such an analysis than it is to make a national income study, thus the latter has a widespread use, while the former has only been used in a few areas.

Input-output analysis concentrates on those figures which national income discards. It places value-added data at one side of the main table, calling them "primary inputs." The compilation of the production and input figures do not tell particularly what, or how much, the economy produces, but it does show in detail the interrelationships of the sectors; i.e. how the economy is put together.

We have to do more, however, than merely take the values of P and I which were discarded in the value-added compilation. We have to break each of them up into component parts that show where each input came from and where each output goes to. Thus in equation form,

$$P_i = \Sigma_j x_{ij} \quad \text{and} \quad I_j = \Sigma_i x_{ij}$$

where x_{ij} represents an intersector transfer. It is with the values of x_{ij} that the analysis is primarily concerned. The normal procedure is to take each industry, list all its inputs with their sources, and then list all the outputs with their destinations. This is done for all industries in the economy, and the figures are summed up; the result is the input-output table. In a specific example, the steel industry may have inputs from mining (limestone), metal mining (iron ore), coal products (coke), utilities (electricity and water), and many others. Its outputs may go to transport equipment (automobiles), construction (steel girders), machinery manufacture, metal products; and in addition, to exports, investments, and consumption (which are external sectors).

It may be thought that such analysis is particularly significant. However, a little thought will show that for each product in the economy there is not just a single series of inputs, but actually a whole chain of them, often feeding right back to the original product. Take the example of hand tools. The inputs into this activity might be steel and wood. The wood comes from the lumber sector which must use tools such as saws and axes to produce this wood in the first place. Thus we are led back to the tool industry. In the case of steel, the biggest inputs are iron ore, coal, and limestone. The extraction of all three of these requires tools, even if it is only shovels, thus we are led back to hand tools. The feedback involved acts somewhat like a multiplier and a rise in demand for hand tools will in the course of time produce an additional rise in demand for the same product. It should be evident that subsequent demands are smaller than their predecessors (for the reason that most individual products are only a small part of the inputs of

the industry using them) and that eventually a limit will be reached. In an economy-wide analysis these limits are shown in a companion to the input-output table, the inverse matrix. The inverse matrix is the most useful form of input-output analysis when applied to the study of an economy.

In order to be of any significance, an input-output table must divide the economy into a number of sectors. Ideally such a table would have as many sectors as there are different types of economic activity. This, however, would mean at least several thousand groups, but the calculations involved in such a large number of sectors would be prohibitive. Furthermore, for an analysis of an economy like that of Nigeria a large majority of the sectors would be virtually blank. Finally, (even in a developed economy) if there are only a few firms in a sector, one runs the risk of significant inaccuracies in input-output coefficients due to the idiosyncrasies of a particular firm. For these reasons, input-output tables are commonly reduced to a manageable number of sectors. For a developed economy this is usually about fifty; for an underdeveloped one, ten to twenty is sufficient. Of course the number and the character of the sectors depend on what the researcher is trying to show. If, for example, he is interested in production of machinery, there will be several sectors for the different types of machinery, while the rest of manufacturing may be aggregated into a single sector.

The allowable latitude in sector choice is quite wide; however, there are certain restraints. The first restraint is that a given product can only be produced by a single sector. Two sectors cannot produce the same thing, because if they did, they would be the same sector. We must be able to identify a single sector of origin for each input; otherwise technological coefficients have no meaning. Thus all of a given product is assumed to have come from one sector

and if it seems that there are different methods of production, they are either producing different products, or their cost structures are identical. Along the same lines we have the restriction that a product cannot be produced by sectors in concert, it is first the product of one, then of the other, not of both simultaneously. What these restrictions mean in practice is that a given firm is sometimes divided between several different industries, even though all are beneath the same roof. Thus we should not expect corporate entities to coincide with input-output sectors.

A more serious restraint comes from the basic production function,

$$X_{ij} = a_{ij} X_j + \bar{X}_{ij} \quad *$$

where $\bar{X}$ is a fixed cost element of production. We have to assume that this term is = 0, at least in the normal production range, in order to get a usable relationship for the input-output analysis, or more correctly, that the fixed cost element is the same at all levels of production, so that we can in effect treat it as fixed investment and not have to consider it in our calculations. The result is that we assume that production is a direct linear function of input. Although this is a restriction on what we put into the analysis, it also allows the analysis to be used as a forecasting tool and as a method of testing the reactions of the economy to a given movement in any one or several sectors. This might make the input-output analysis rather unrealistic over large movements in the economy, particularly in the case of lesser developed economies where a given movement is a large portion of the total function, but

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*The input from industry i to industry j (X_{ij}) is equal to the input coefficient between sectors i and j times the production of sector j, plus a fixed production cost associated with this input.

it does make the arranging and utilizing of available data much more simple. Thus in our Nigerian case, using the assumption of linearity, we could operate with data from other time periods and other production levels, and translate to our own time period and production level by a simple ratio method as long as one piece of information about our period was available. As will be seen, this technique has been used extensively. It also allowed us to use data from a single instance and to compute directly the input-output ratios instead of the theoretically correct method of taking several time periods or production levels and extracting the fixed cost elements to get a true input-output ratio.

Thus we have our basic equation,

$$X_{ij} = a_{ij} X_j$$

where X_j is the total production of the sector, X_{ij} is the input to sector j from sector i, and a_{ij} is the input-output or technological coefficient. Restating this equation we have

$$a_{ij} = \frac{X_{ij}}{X_j}$$

which is the basis for our Table III (Chapter IX) and the display of all a_{ij} in a square matrix is known as the technological matrix. From this matrix we can predict for a given total output, exactly what the input requirements will be for the particular producing sector.

Returning to our transaction matrix (Table II, Chapter IX) which is an array of the values of X_{ij}, we see that the bounds of the intermediate uses of outputs, (that is all goods that do not go to final output and are thus consumed without further change) are formed by two relationships;

$$\Sigma_i X_{ij} = I_j \quad \text{and} \quad \Sigma_j X_{ij} = P_i$$

the total intermediate inputs to sector j and the total output to intermediate uses of sector i. Also, we can take in the external value-added parts of the table and say that I_j (the local inputs) + M_i (the imported inputs) + N (the value added) = X_j (the total production); this takes care of the column relationships. As for the rows, we take P_i (the intermediate uses of output) + Y_i (the final uses of output) = X_i, the total output.

A word about final output. This is external to our matrix and is the residual that does not go to intermediate use. Normally it is these areas of the economy that consume but do not produce, for example exports, personal consumption, government, and investment (this latter area does not produce in accordance with our production function, and it is also assumed that production from it is a long-term affair).

We now have the analysis in a form where it can be used to predict and project as long as we are concerned only with changes in the <u>total</u> production of a given sector. However, in most cases the total production of a sector involves some intermediate uses which we cannot predict beforehand, and thus all we really will know is the change in final use of the products of the sector. What we need is an expression of what will happen to the economy if a particular final demand for a particular good rises; for example the effects of a decision by government to buy a large amount of cement for a particular construction project. With our present tables we can state what we will need in the way of inputs to produce a given amount of cement, but we cannot say anything about the industries which supply the inputs to cement, which in turn have calls on other industries, which in turn may lead us back to the cement

industry calling for an additional output, or more important, to the importing area of the economy which may cause an unexpected drain on the foreign exchange of the country. We can actually trace these effects, but it would be a matter of a long series of successive approximations, a highly tedious procedure. What we need is a display that will quickly indicate the sum total of demands on the internal and external economy, given a rise in a specific final demand. Fortunately such a method exists, but it involves matrix mathematics. The result is known as the inverse matrix.

Returning to our production functions, we have, for a particular producing sector,

$$a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + \ldots + a_{1n}X_n + Y_1 = X_1$$

and so on for all the other sectors. If we now arrange these equations in a row, one beneath another, we have, in effect, a mathematical expression for Table II (Chapter IX). This display can also be stated in matrix notation form as

$$[X][A] + [Y] = [X] .$$

Rearranging, and at the same time noting that any matrix multiplied by the identity matrix $[I]$ is equal to itself, (thus $[X][I] = [X]$) we have $[Y] = [X][I-A]$. The identity matrix has ones on the diagonal and zeros elsewhere, and thus, since our A matrix (Table III, Chapter IX) has zeros on the diagonal, the resultant matrix, $[I-A]$, sometimes known as the Leontieff matrix, has ones on the diagonal and is negative elsewhere. Now we want to solve for $[X]$, which will represent the total necessary production changes in each industry, in terms of $[Y]$ and $[I-A]$. The result is $[X] = [Y][I-A]^{-1}$, and $[I-A]^{-1}$ is the inverse of $[I-A]$. Thus

we can take a given change in final demand Y and multiply it by the corresponding values in the $[I-A]^{-1}$ to find the total change in production that will result from this change in final demand.

To invert the matrix is a relatively simple process in determinants if the matrix is small. If it is large ($>$ 3 x3 or so), it becomes a problem for a computer. The inverted matrix for the Nigerian economy appears in Chapter X. With the amount of theory presented above we can now proceed with actual compilations. What we shall do is to calculate input and output accounts for each individual industry, firm, or sector depending on the information available. These accounts, which are presented in Chapter VII are then compiled in Chapters IX and X and presented there as the final results of our study.

CHAPTER III

SOURCES OF INFORMATION, THEIR QUALITY AND QUANTITY

In this chapter we consider the information used to create the input-output flow accounts and discuss the nature of the data sources. We can divide these sources into four groups; published information, unpublished government data, private studies, and the personal observations of the author. Our purpose here is not only to acquaint the reader and the researcher with the information sources, but also to make clear exactly what was used for the study in order that sources not mentioned, and thus unavailable to the author, may be directly applied by subsequent researchers, judging for themselves the reliability in comparison with sources that were used. Also, sources mentioned whose data is in apparent conflict with the information in this study can be considered to have been discarded by the author in comparison with more accurate and more reasonable data. In effect, however, the student can follow the steps of the author from the data to the finished product seeing for himself the various decisions that were made.

Published Information

The first source, almost by tradition, for any study of the Nigerian Economy, is, of course, the World Bank Mission report, published almost ten years ago.[1] Now rather out of date as far as information that is usable is concerned, it has a wealth of descriptive material and provides a very good background to the economy. As the quantitative information contained in it is, at the latest, for the year 1953, it was not particularly valuable in the actual construction

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[1] "The Economic Development of Nigeria." I.B.R.D. Mission. Hopkins Press, Baltimore, 1955. (Also published in soft cover in Nigeria.)

of our input-output accounts for 1959/60, however, it was used for some of the descriptive work, particularly agriculture.

One of the real foundations of our input-output study was the work of Dr. Okigbo.[1] This report, an undertaking of monumental proportions, is today the background source for most economic studies in Nigeria. It covers the whole area of National Income accounts, and even more valuable, it outlines many of the techniques utilized in arriving at the figures presented. Without this report it is doubtful that the present study could have been undertaken, as it provides not only usable information, but also a lot of data for checking various calculations. Peacock and Dosser[2] suggest that the essential forerunner of any input-output analysis is a good national account study, such is the relationship of the Okigbo work to our input-output analysis.

Although the Okigbo work stops at 1957, it does provide a time series (1950-57) for most of its figures. Thus it was a fairly straightforward process, in most instances, to project the series to our time period. As our input-output analysis was concerned more with the industrial sectors of the economy, Okigbo was used extensively to obtain agricultural figures. We made frequent use of his chapter, "Methods of Estimation: Gross Domestic Product." When we came to the estimation of industrial accounts, Okigbo was used to provide over-all checks, and where the figures are noticeably divergent an attempt was made to explain the difference. It should also be noted that the present study differs in its treatment of small industry, Okigbo puts it into

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[1] "Nigerian National Accounts," 1950-55, Dr. P. N. C. Okigbo, Enugu, Nigeria, 1961. Referred to in this study as "Okigbo."

[2] Peacock, A. T. and Dosser, D., "Input-output Analysis in an Underdeveloped Country: A case study." Review of Economic Studies, Volume 25 (66) 1957-58, p. 21-24.

a handicraft sector whereas the input-output limitation on joint products makes it necessary for us to place small industry in the sectors corresponding to the product of the individual firm. Also, our approach to small industry, in order to estimate its size,[1] is considerably different from that of Okigbo, who used tax records.

It is strongly recommended that the serious student of the present work first familiarize himself with the work of Okigbo.

Another work of value, although somewhat overshadowed by the Okigbo work, is the "Economic Survey of Nigeria, 1959."[2] While some of this material is as late as the end of 1958, most of it is for the fiscal year, 1956/57 and thus is not of immediate use in the present work. However, it contains more descriptive material than Okigbo, as well as a lot of primary data, such as numbers of animals slaughtered, tonnages of certain crops, etc. As is the case with most published information, it deals more with the export and import information than with the internal data and thus was of limited use. Also it is a work written from the point of view of the Federal Government; thus it skims very quickly over the private sector.

Next we should mention the FAO/ICA report on agriculture in the Northern Region.[3] As this report is concerned with descriptions and recommendations, it is of incidental value to our study. It presents figures only as a means of describing situations and not particularly as data to be worked with. However, the figures given are for the same time period as our work and thus

[1] See Chapter V.

[2] "Economic Survey of Nigeria, 1959." National Economic Council, Lagos, 1959.

[3] "Report on the Agricultural Survey of the Northern Region of Nigeria by the FAO/ICA Team." Kaduna, 1960.

are of some value. One gets the impression, however, that accuracy of data was not a prime consideration, and we found some of the figures in serious divergence with other data. Thus not all the figures were directly used.

The "Handbook of Commerce and Industry,"[1] although it appears to be directed to the import and export trade, contains quite a bit of material, and proved to be particularly useful in calculating the duties and excises on various Nigerian and foreign products. It also contains a survey of Industrial Production in 1959 (reprinted from the Trade Journal) which was a useful check list for the industrial sectors of our study. Also of great utility were the chapters on public utilities and exports. The book, which is revised every few years will always be an essential part of any library of Nigerian economic information.

Of a different nature from the preceeding references, is the "Annual Abstract of Statistics."[2] This work contains a vast amount of primary data on almost every conceivable subject and proved essential for information on production by public utilities, purchases by the marketing boards, producer prices for agricultural and livestock products, retail food prices and indices, certain transport information, and population data. Because our study cuts across marketing board years it was necessary to go beyond the data of the "Abstract" and work with the "Quarterly Digests of Statistics"[3] which contain some of the same data as the "Abstract" but on a quarterly and sometimes monthly basis.

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[1] "Nigerian Handbook of Commerce and Industry," Federal Ministry of Commerce and Industry, Lagos. 4th Edition, 1960. (A 5th edition was published in 1962.)

[2] Federal Office of Statistics, "Annual Abstract of Statistics," Lagos, 1961.

[3] Federal Office of Statistics, "Quarterly Digest of Statistics," Lagos, various dates. Used in this study were vol. 9, no. 1, January, 1960, and Vol. 10, no. 4, October, 1961.

Absolutely essential in order to determine some of the over-all external constraints on the Nigerian economy, were the "Nigerian Trade Summaries."[1] From these the export products could be accurately quantified, and average prices of imports could be obtained. One might wish that some of the categories were more finely divided, but on the whole the material presented is some of the best available in the country. Since the data published comes from import and export invoices through a long channel of data processing, it might be expected that some of it is not entirely accurate,[2] however, this is a matter of improving the system, it would be impossible for a researcher to get more accurate data, thus we must be content with the published figures.

Also useful in the field of statistics, but unfortunately not published after 1958 were the "Trade Reports."[3] These are a yearly compilation of the monthly summaries with added information as to country of origin and destination, duties, listing of numbers as well as weights, and breakdowns of major exports by ports. The port information proved to be very useful when calculating the transport contributions to export values.

Continuing with Federal sources of data, we should mention the quarterly Nigeria Trade Journal.[4] This magazine, the principal publication of the

[1] Chief Statistician, Federal Office of Statistics, "Nigeria Trade Summary," Lagos, published monthly. Used in this study were March, 1959, December, 1959, and March, 1960.

[2] Prior to the present study, the author was involved in a number of economic and industrial studies in Nigeria, one of which involved obtaining information directly from customs invoices. It was found in this case that quite a bit of information had become distorted between the invoice and the published statistic. This distortion arose primarily in the assignment of a given import or export to a statistical category.

[3] "Trade Report for the Year," Department of Statistics, Lagos. Annually. Used in this study were 1957 and 1958.

[4] Federal Ministry of Commerce and Industry, Nigeria Trade Journal, Lagos, quarterly. Used in this study were issues from 1956 to the present.

Ministry of Commerce and Industry, contains many useful industry articles. These tend, however, toward the descriptive rather than the quantitative and thus were of greater use to the background understanding of the industry being studied. They also contain annual summaries of industrial activity, summaries of the mining industry (with production data), and reports of the activity of marketing boards.

The Stanford report[1] on transport in Nigeria was used for the transportation sector, and also as a source of ton-mile cost figures used in estimating transport contributions. As it is a report on conditions, and its purpose is to recommend, there is not a lot of information directly usable for input-output purposes.

More useful were the publications of the Railway Corporation[2] as from these could be obtained goods transported in terms of quantity and cost of transport. Also, the Tariff provided a method of making estimates of transport costs especially where the distance was large and it could be safely assumed that road transport took very little of the product. Another useful part of the Tariff was the listing of coal prices. As the Railway Corporation markets most of the out-put of the Coal Corporation, this gave us a direct estimate of the price of coal throughout the Federation, and since the pithead price was known, transport contributions could easily be determined.

A good quantitative and qualitative description of the economy, month by month, at least as far as major areas of commerce and industry are concerned,

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[1] Stanford Research Institute, "The Economic Coordination of Transport Development in Nigeria." Menlo Park, California, 1961.

[2] "Report for the Year 1959/60 and Tariff No. 5," Nigerian Railway Corporation, Ebute Metta, 1960 and 1959.

is available in the Overseas Review of Barclay's Bank.[1] It appears as though the Bank has an excellent research staff, and the Reviews contain quite a bit of information not elsewhere available. This is not the case with the majority of foreign reports on Nigerian conditions, as most of these seem content to give their readers a rehash of information published by the government. Thus the Overseas Review was the only "foreign" publication used in our study.

Next we should mention the "Marketing Board Reports."[2] These are essential for calculation of the accounts of the products they sell, however, in some cases the information is not quite as clear as might be desired. From these reports we got purchases, buying allowances, transport charges, etc. As the crop years did not coincide with the study year, a good bit of recalculation had to be done. These reports are published on a regional level.

Also useful were the various "Industrialists Guides" to the regions.[3] In some cases these contained nothing more than a restatement of Federal information, but the "Northern Region Guide," in particular, contained a fair amount of regional data not elsewhere published. Also on a regional level were the reports, where available, of the Development Corporations.[4] These were particularly useful in calculating the accounts of the industries owned

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[1] Overseas Review, Barclay's Bank, D.C.O. London, monthly. Used here were issues May 1959 - May 1960.

[2] "Annual Reports of the Marketing Boards," Ibadan, Enugu, and Kano, covering 1958, 1959, 1960.

[3] "Industrialists' Guide to Northern Nigeria" (no author or date, but obtainable from the regional Ministry of Trade and Industry); Western Nigeria, Gateway to Africa, 1959; "Investment possibilities in the Eastern Region," Enugu, 1959, "Investment Opportunities in Eastern Nigeria," 1960.

[4] "Annual Reports of the Development Corporations," Ibadan, Enugu, Kaduna. Various years.

by the Corporations. Finally, the Western Nigeria Statistical Bulletin[1] and the "Eastern Region Forest Department Report"[2] were used in the calculations of the timber and sawmilling sectors of the economy.

Unpublished Government Data

The first document in this category was unpublished at the time of the fieldwork for our study, but has since been published by the Ministry of Commerce and Industry. It is the Industrial Directory, and lists all the major manufacturing establishments in Nigeria by size, industry, and location. The cutoff point for "major" is ten employees, i.e. firms with less than ten do not appear on the list, but even so the list contains about seven hundred names and thus proved to be a rather good check list for the industrial sectors of the economy. A companion piece to this list was an unpublished (because it was believed to be incomplete) tabulation by the Department of Statistics of firms by location, size, and industry. This however did not list the firm names as was the case with the C. and I. list. It was interesting to not, however, that the two lists did not entirely agree, thus presenting some doubt as to the exact population of certain industries.

Another source, unpublished because it was not only incomplete, but also because the area which it covered had been drastically changed by urban renewal, was the Commerce and Industry survey of manufacturing in Lagos. This appeared to cover all firms, regardless of size, and also gave some information as to size of output, exact type of product, etc. It was particularly

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[1] Western Nigeria Statistical Bulletin, Ministry of Economic Planning, Statistical Division, Ibadan., Vol. 1, no. 1, June, 1959, Vol. 2, no. 2, December, 1960.

[2] "Eastern Nigeria, Ministry of Agriculture, Forest Division Annual Report," 1959/60, 1960/61.

valuable in that it had been done in late 1958, just a short time prior to the study year we were concerned with. In the end it was used primarily to get an approximation of industry populations in the Federal Territory. In addition, its coverage of Apapa was excellent enough to be used quite extensively for quantitative purposes.

Another very helpful document, partly because of the methods of estimation, was an extension of the Okigbo tables from 1957 to 1960. This was prepared by the Economic Planning Unit of the Ministry of Economic Planning as a background work to the Development Plan. Throughout our study it has been very interesting to compare our industrial estimates with those of E.P.U.

We come now to the documents that formed one of the real foundations for this study and without which we really could not have produced a work of any accuracy. These documents are the Annual Industrial Production Questionnaires of the Department of Statistics.[1] Sent out to approximately seven hundred establishments,[2] these questionnaires cover the whole range of cost and output information of each firm. They are sent out on an annual basis coinciding with the government fiscal year. Thus most of the returns were for the fiscal year and the decision to make our study for a similar period followed very easily. Forms are sent out each February asking for information about the year that ended the previous March. It then takes from six months to a year to get the forms returned. The author gathered his information in March 1962; thus the forms for the year 1960/61 were just being sent out and the forms for 1959/60 were fairly complete. Thus we decided to make the study for

[1] We are indebted to the Chief Statistician and his staff, particularly Mr. Adewale and Mr. Umoh for their cooperation in making these forms available and for assisting the author in gathering information from them.

[2] The mailing list corresponds in general to the Commerce and Industry list.

the year 1959/60 (April - March), although information was taken from all the forms available in order to have a time series if necessary.

The returns covered six categories, not all of which were used in our study. They were, employment, inputs, outputs, inventories, capital expenditure, and future capital plans. From employment we used only a total wage figure and an employee count. Inventories yielded a total beginning and ending figure. Capital expenditure gave figures for investment in new and used assets, depreciation, disposals, and beginning and ending values. Under outputs were products in quantity and value both at sales and production cost. Inputs were the most extensive and were (theoretically) broken down into local and imported production, inputs, fuel and electricity, repairs, administration, rents, insurance, contracts, interest, and other production inputs. Thus from one form, correctly filled out, the basic cost structure of a firm could be constructed. Of course, not all forms were, in practice, correctly filled out, thus causing a bit of uncertainty and sometimes a bit of confusion in trying to arrive at a cost pattern.

Related to these forms were another set of returns of the Statistics department; the quarterly reports of production. These were somewhat newer and thus hardly covered 1959/60, however they were very useful in determining more current outputs of firms and thus providing a basis for interpolation where the only other returns were for years prior to 1959/60.

Finally the department had, on file, copies of the annual mining returns. This is a well-established return covering mainly the tin miners on the Plateau. The information on the forms is extensive and formed the basis for the account labelled "Metallic Mining."

Private Studies

Here we come to a rather mixed group with very diffuse boundaries. The number of private studies that have been done in Nigeria is almost endless; all have some relevance to our study, only a few, however, were used.

To begin with, we should mention the twenty-five or so studies done over the past few years by the Rockefeller Brothers Fund, in Lagos. Ranging from the excellent to the ordinary, they are, in general, concerned with feasibility of proposed industries; however, in the process they cover a lot of the existing ones. In particular the studies that were of use were those on singlets, concrete blocks, gravel, lead products, and poultry.[1]

One of the pillars of our study, at least as far as small industry is concerned, is the work of the AID industry office, primarily in the Eastern Region of Nigeria.[2] This is the first thorough tabulation of small industry in the country, and it is the first real attempt to identify the problems of such industry. The work lists, by some thirty-six industry classifications, and by size of establishment up to ten employees, some eleven thousand firms in fourteen towns of the region. The exact manner in which we used this information is outlined in Chapter V.

At the same time that the small industry count of the Eastern Region was being made, its author also gathered a substantial amount of companion data on output and value added for these firms. We were very fortunate in being able to have access to this data as well as to talk extensively with the author. His information was used almost exclusively in the small industry parts of our work.

[1] These reports are generally available from the Resident Director of the Fund in Lagos.

[2] Kilby, P.,"The Development of Small Industry in Eastern Nigeria," A.I.D., Industrial Development Division. Lagos, March 1962.

Personal Observations.

Into this category fall a lot of qualitative ideas and a bit of quantitative information. We spent eighteen months prior to the present study engaged in economic and industrial studies in Nigeria, and thus acquired a certain knowledge of the economic functioning of the country. This has not been an extensively used primary source, however, as other sources could be considered as more reliable and accurate. In addition, there was a certain amount of direct observation of industry during the period of data gathering for our study. The particular areas were the Mid-West Region and the town of Lagos. This type of information was used only to supplement other sources.

CHAPTER IV

RELIABILITY

In this chapter we discuss the accuracy and reliability of the sources of the previous chapter and try to present some of the value judgements that were placed upon them when they were incorporated into our calculations.

To begin with, published sources must be considered to be as accurate as anything available for the study. This is particularly true for the secondary sources, that is those that present data that has been prepared by thoughtful researchers before publication. Into this classification would fall the World Bank Report, the Economic Survey, and the masterpiece of Okigbo, although the latter work, so complete in its description of method, allows the student to question the original data, if it seems to differ with his own, without questioning the preparation of the material. Some readers have questioned this work because it leaves out certain items,[1] but what is presented in it must be taken as correct.

This however brings up a definite limitation on almost all sources encountered in Nigeria, that of omission. Nigeria is a vast country and the various gatherers of information are few. Thus, a perfectly good work will almost always leave out something, simply because of limitations on time and manpower. Take, for example, the question of how many industrial establishments there are in Nigeria. It would seem that, in a relatively unindustrialized country, counting would be simple, but just the opposite is the case. The number of firms is very large, and most firms are very small. Thus all

[1] See "Report of the First AID Mission to Nigeria," p. 52-53. In this report mention is made of Okigbo's apparent omission of such accounts as gathering of wood and drawing water.

lists are forced to put a lower limit on the size of the firm included, the result being that the various lists all differ. The works of the Ministry of Commerce and Industry are quite good, but they cover only what is physically possible with their own manpower; thus we have had to add other sources to approximate a complete list. Even our present study is far from comprehensive, it would easily take several additional man-years to bring it even to within 5% of absolute reality, particularly if we contemplate the small-firm situation.

The error of omission is particularly evident in primary sources, and it seems to occur in inverse proportion to the presentation of incorrect information. This is the case with the Department of Statistics, which is extremely careful not to publish anything unless it has a high probability of being true. Thus we can assume that the published works of this department are of high accuracy as long as we do not assume them to be comprehensive.[1] The trade figures of this department can be, as was mentioned in the last section, subject to errors in data processing, particularly in the transcription of the primary invoices to the computer system, and thus might be suspect as far as accuracy is concerned. It is a physical impossibility for a statistician to check the accuracy of data processing. However, we have assumed that this type of error is relatively small in comparison with those of the major sources of our work.

Reports of public corporations, marketing boards, and development banks are all subject to normal annual report processes. If read with a sharp eye

[1] The only case of incorrect figures encountered was in the Quarterly Digest of Statistics, Vol. 10, no. 4, October 1961, p. 73. The figures are on purchases of agricultural products. Most likely this is a printing error, rather than a statistical one.

they are quite accurate, but due to the large number of accounting maneuvers designed to make an annual report fulfill a particular function, their figures can rarely be taken and used directly. However, as these sources were not a major factor in our study, problems with them were few.

Personal information as a source is always subject to inaccuracies, thus we have avoided using it quantitatively in our study except in those cases where there was no other data available. Where it has been used has been noted in the flow accounts so that subsequent researchers may immediately verify or disprove it.

Private studies are almost always suspect. Particularly if they have been done to prove or disprove something. Omission of data either by lack of resources to get it, or in order to prove a point, is quite common. However, in most instances the information extracted from these studies was of a neutral nature and so could be considered as being accurate but not always complete. The AID study of small business we consider to be fairly accurate, probably more so than its author claims. The research that went into this report was 'diligent' and far more comprehensive than anything before it. It only claims to have covered parts of the Eastern Region and these are clearly outlined. We assumed the data to contain far less error than was introduced in the processing of the data in our own study (see Chapter V). As was mentioned earlier, the researcher also provided us with cost structures for individual firms. Each individual firm's cost figures are probably only vaguely correct, however there were enough samples so that most industries could be aggregated, and it was assumed that in these sums errors would tend to cancel out. Whether this was actually so could not concern us greatly, as this was just about the only data available on small industry,

and thus we had to use it. We point out the assumption here primarily to indicate that this area could use a lot more study.

The unpublished government sources, for the most part, were unpublished for a very good reason; the office possessing the data considered it not accurate enough for publication. This was the case with the C. and I. survey of Lagos, and thus we used it only to supplement the more accurate AID information. The Industrial Directory was probably withheld for the same reason. An exception to this was the projections of the Okigbo work by the E.P.U., as there was no real reason for publication in this case. The methods of projection and estimation are clearly outlined in this document, and as it is founded on published and publicly available information, the only location of error would be in the techniques themselves, not in the data. However, the techniques are quite sophisticated and can hardly have produced more error than those utilized in our study.

The Industrial Production returns of the Statistics department were unpublished for several reasons, all of which have bearing on this study, as we used data from these returns quite extensively. The first and probably most important is that the returns are covered by the Statistical Ordinance of 1957, which prohibits revelation of information submitted to competitors or tax authorities and goes on to say that published data from these forms must be in "aggregate form." This convention has been followed in our work; where an industry account covered only a single firm, we have combined this account with that of another industry in the same sector. This explains the union of such activities in our accounts as tea and margarine. The second reason for non-publication is common to a lot of our sources, the returns were incomplete. Thus the reasoning that it would not be sensible to publish statistics about

an industry unless data was at hand for all the firms in that industry. Since this condition of completeness was never fulfilled, information from the Industrial Productions Returns has never been made public. This state of having only some of the members of an industry was one we encountered many times, and as long as we knew the total number of firms, or had any figure covering the whole industry, we could make estimates or projections. Errors were more likely to have been introduced in our estimating process than to have been inherent in the data. Finally, the third reason for not publishing information from the returns was that the process of filling out the forms introduced many errors on the part of individual firm accountants. It is quite evident from scanning even a few forms that there was a high incidence of either omission of certain items, or incorrect reporting of others. A valid conclusion is that the forms were far too sophisticated for the average accountant, they ask for too much, and their language is that of the statistician, not the businessman. However, as this was the only real information we had to work with in the area of manufacturing data, we took all that was available, determined to make something of it. It was surprising how much turned out to be good material, and how most of the apparent errors could be rectified by assuming the role of the accountant and asking why a particular figure appeared where it did.

Thus we have assumed the information on the returns was as accurate as any of the rest of the data we had available. There were, of course, a few cases of gross inconsistencies both within the forms and also with external data; the soap industry is an excellent example. Where such was the case, we have pointed it out in our accounts, so that subsequent research can clear up the question.

In sum, we concluded that the data available was reasonably extensive and of varying accuracy. It is doubtful that anything we have called upon is entirely accurate. However, to improve upon it would quickly get us to the point of diminishing returns. Certainly our study could be made more accurate, and we have tried to identify the specific areas of weakness, but to attempt to improve the accuracy of all the data would mean many years more of research, the returns from which could hardly justify the effort.

CHAPTER V

TECHNIQUES AND SPECIAL CONSIDERATIONS

At this point we present a discussion of the numerous techniques that were utilized in the process of converting the data from raw form to the presentation in Tables I and II, and more particularly the methods used to produce the flow accounts in Chapter VII. A good deal of this is covered in particular cases in that Chapter, here we discuss the general case and also present some of the, almost arbitrary, breakdowns employed.

We realize that such a presentation exposes what in some cases are very weak points in the analysis, however, as this paper is intended to be built upon by subsequent research, it seems far wiser to lay open the full computational story.

Let us begin with what is probably the most useful technique and one which is especially adapted to input-output analyses, the idea of time projections. By this we mean the changing of data from one period to fit another period using only one or a few pieces of information about the desired period. As it was necessary to choose a time span for analysis, and as government years in Nigeria end on the 31st of March, we started with this fiscal year, choosing the most recent one for which there was sufficient information. As mentioned earlier, we decided upon the year April 1959 to March 1960. Initially about 50% of the data fell directly into this period, the rest was either from an overlapping period, or from a separate period. In some cases the period involved was not a full year, in a few others it was eighteen months. All this divergence meant that a technique had to be devised to fit all data into the selected time period.

Fortunately, input-output theory provided the method. We stated earlier that one of the basic assumptions of the analysis is that output is a linear function of input and that therefore the technology coefficient should be valid at any level of production. Extend this to include the ratio of any input to any output, and we have our needed technique. This ignores, as does the analysis, the fact that technological coefficients change over time and also that in situations of only a few industries in a sector the apparent coefficient may be different from the real long-run ratio. The end result is that the ratios and flows calculated represent average values over a time span of several years, or in more accurate cases, the instantaneous value for the specified time period of a ratio that is changing during the longer time span.

In a typical case, we would have information about a given company or industry for the year following the one we were interested in. Then we might have one piece of information from an earlier year, perhaps nothing more than a value-added figure from the Okigbo study. However, this immediately gave two points on the time series line of value-added. Interpolating gave the value-added for our desired time period and the ratio of this figure to the corresponding figure, where we had the complete data, would then be applied to all figures in the complete list.

Frequently we had to go one step beyond this as we not only did not have information in the correct time period, but also it did not cover the entire industry. A typical case might be that of having information about two companies out of an industry total of five. Here we would have to project the two firms to a supposed five firms before translating the time period. Sometimes we had information about the whole industry and thus could project. Often the information about the total was in another time period which meant

time translation first, and so on in this manner, sometimes building several levels of projections. Lacking total industry information we would have to make, for example, a simple 1:2 ratio projection, under the rough assumption that all firms were about the same size, or more specifically that the average of our sample was identical to the average of the whole population.

In certain cases we lacked data of any kind about inputs and/or outputs and were forced to use other techniques. One method is to use ratios from other input-output studies. This was done only once in our study, although frequent use of this technique would have simplified the calculations. We felt, however, that to borrow other-country ratios would destroy the local quality of the study. Where we did borrow ratios it was for the output of an industry for which we had the magnitude, but had little or no idea of the users of this output. Another rarely used process of borrowing was that of prices. The need for this arises when the input is supplied by the manufacturing company itself, and thus does not appear on the accounts. This was the case with the limestone for cement, all of which is mined on the spot. Another technique is to examine the production process itself and determine the ratios of the various inputs on a physical unit basis. This becomes useful in industries where one can calculate the entire internal flow pattern in physical units before translating to money flows. Such was the case with soap, where the apparent contradiction of input costs made it necessary to go to the physical units. Here we had an absolute measure of some of the inputs and outputs, and application of organic chemistry produced the total internal flow. Similar calculations were employed with industrial gases and with bitumen; in the latter case it was necessary to calculate the number of drums required to contain the output, and this then became the input from metal drum manufacturing.

In certain industrial groups we found that there were perhaps thirty to fifty firms per group and that we had on the order of 20% of the firms in our detailed records. This was enough to employ a refinement of the earlier projection technique. Here we divided the firms into groups according to size, usually on the basis of number of employees, as this is the most easily obtainable piece of information about a firm. The firms for which we had data we also divided up this way and then input-output projections were made on the basis of these subgroups before combining all the groups to give the industry flow account. This method removes errors arising from the assumption that all firms, large and small, have the same technological coefficients. This technique was used with textile manufacturers, soft drink makers, vehicle repairers, and others. It was also extensively used on the small industry projections (see below).

One of the most important methods, especially in the agricultural sectors was that of residuals. Here we had an export figure and sometimes a marketing board purchase figure. We started with these totals and worked backward. The export figure includes duty, so the first step was either to take the duty-collected figure from Government data or to calculate the duty payable on the basis of the quantity exported and the schedule of duties. The next step was to relocate the product at the place of origin rather than at the seaport. This could be approached in several ways. Often there were railway revenue figures for the product, and these were considered valid if it was known that virtually all of the product went out by rail or it could be assumed that the distance was too great for profitable road transport.*

* A short analysis of average road rates compared with railway tariffs indicates that as far as Lagos is concerned, points beyond Ibadan would find it cheaper to ship by rail.

Having relocated the product, we often had a local buying price and thus could assign the difference to charges for service and trade, or even to marketing boards. Where the product needed to be bagged or baled, we were able to figure out the cost of such packaging; thus some agricultural accounts show imports by the service industry. In many cases, however, we had no information other than export and duty. Here we simply assigned 10% of the export-before-duty value to transport, and similar amounts to trade and service. This method was often used in reverse for imports. After adding the duty to the import we would then assume that there was a markup of 30% of final selling price divided equally among trade, transport, and service. This was done in cases where we knew where the product was consumed or who bought it, and we knew the quantity, but not the price. It was also used as the local markup on domestic food between the producer and consumer. In other cases we had a definite figure in a company's records for the item in question. Here the difference between this figure and the after-duty-import figure was divided equally among the three sectors producing the markup. Finally, in certain cases we did not even know the import value, so we simply took off a 30% markup, and divided in the normal fashion.

It may be argued that this method is rather arbitrary and tends to make the three large sectors all equal, yet for a first approximation there is really no other method.* : We might point out that the results in our case gave a surprisingly good figure as far as other estimates were concerned, and also that the boundary between trade and service is not well-defined at

* It would be better to make the breakdown according to the relative sizes of the sectors, yet this would involve either a priori information, or a series of successive approximations far beyond the manpower available for the study.

present, this being the one area of the Nigerian economy about which very little is known. On an over-all basis the 30% markup figure seems to agree with other estimates. A more detailed discussion of this residual sector problem appears at the end of Chapter VII.

Another technique involving residuals was that of assigning the outputs of an industry. In these cases we knew what production and sales were, but had little or no idea of how much went to each of the assumed users. Often the users would include consumption and investment (final uses) as well as intermediate uses. Here the initial step was to assign the entire output to consumption and/or "other uses." Then calculations would proceed for other accounts and other sectors, and at the end of all calculations, the explicitly mentioned uses of the output that was previously undefined would be netted out from the consumption figure. This was used particularly in the industries whose outputs were repairs and miscellaneous products. In vehicle repairing, for example, we knew the total output of repairs, but we had no idea of how much of this was intermediate use until all flow accounts were completed. The final subtraction of the intermediate use from the total gave the consumption use.

Time series projections were another useful tool. This type of calculation differs from the time interpolations mentioned earlier in that there is no data about the needed time period or about subsequent periods. Thus figures have to be projected forward. For the most part we made these projections by finding the average change over a number of years and then applying this to the time between the latest data and our calculation year. Most often this was used for price information, where nothing much has been recorded since the 1957 Okigbo work. In the case of subsistence agriculture,

we had to be a bit more careful. Average increase projections would not be particularly valid as the production (at least according to Okigbo) varies over a wide range from year to year. In the end we decided to project by a rather conservative measure. A projection line was run through the minimum points of the curves for the four sections of subsistence agriculture. Even here the accuracy is very crude, the standard deviation of this projection in our study is about (plus or minus) 30 million pounds sterling.

Another technique which is often used, (but this should not be a habit) is guess work. We tried to keep this to a minimum, but there were some cases where we simply had to make our own estimate, based usually on our intuitive feelings about the matter. Where we have done so has been noted in the flow accounts of Chapter VII.

Inventories presented a problem for a few items. In most cases the differences between production and sales were small enough so that they could be ignored. However, for accounts such as groundnuts, where a large part of the crop spends quite some time waiting to be shipped, the problem requires attention. Our approach in the Marketing Board cases was to let the Boards act as a reservoir rather than assume that agriculture had not yet produced the goods. Where the Marketing Board was not involved we simply had to assume production of the excess had not occurred. The problem here is that this tends to distort the input-output coefficients. Happily the inventory problem did not often occur.

In one or two cases we found ourselves with the problem of a non-cash transfer. The best example of this is the cotton seed that is returned to the farmers for replanting. They pay nothing for this seed, yet if it were exported, it would have a value to the Marketing Board of £ 7 per ton. Thus

we have to assume a "phantom" transfer of raw cotton of the same value from the farmers to the Boards. The end result is that the farmers are really paid more for their products than the official price; all this means adjustment of published figures. We ran across this problem again with the case of the sawmill that generates a sizeable amount of electricity for its own and the local town's use. Here we have one company involved in two sectors of the economy. Since the common element was wood chips used as fuel, we valued these to balance the internal use plus external sales, thus producing a sale by sawmilling to electricity and a partial balancing figure in our final tables.

Transit trade was another problem. For the most part this trade is done in bond and never enters the import and export figures of the country. There are, however, a number of cases where foreign agricultural products enter the local marketing, and sometimes processing, systems before being exported. Our approach to this question was to consider the nature of the journey through Nigeria. Only in the case of hides and skins could it be said that the product did not undergo transformation in the country. Here we netted the probable imports out from the recorded export figures, and placed in our flow accounts only the amounts of trade, transport, and service added on in transit. Other products like cotton, and cattle, undergo processing and thus are included in the flow accounts; the foreign contributions were labelled "imports." In one case, palm kernels, there seemed to be a definite unrecorded export trade from the Western Region to Dahomey. Here we valued the trade at the price which could have been obtained from the Western Region Marketing Board, and added the total to the export figures.

Having discussed methods, let us now turn to some of the breakdowns of general items that were employed. As will be seen below, the data sheets on

particular firms, contained a number of general headings which served to describe the internal use of inputs rather than the nature of these inputs. The one most often encountered was "administration;" others were "local supplies," and "repairs." Luckily the latter item was broken down by type of repair. We made the arbitrary decision to assign all vehicle repair to Transport Equipment, all plant and equipment repair to Metallic Manufacturing, and building and ground repair to Construction. In the case of administration we used a breakdown based on guesswork; 40% to service, 20% each to imports and miscellaneous, and 10% each to trade and transport. Local supplies, unless they could be definitely traced to local production, were assumed to be imported by a trading company and bought locally as inputs. Thus our breakdown of this category was 50% imports, 25% trade, 15% transport, and 10% service. Imported inputs listed as such were assigned 70% imports, and 10% each for trade, transport, and service. If the user was a large company, we assumed that the import was direct and thus omitted the trade margin. Similar breakdowns were applied to buying allowances (the fees paid by the Marketing Boards to get the crops from the farmer to the port). It was assumed that 80% of the allowance was service and that the other 20% was imports, service, trade, and transport. However, neat as these breakdowns may seem, we should point out that they were often modified when other information was available or when a certain item seemed to be unrealistic.

The question of miscellaneous manufacturing may at first seem confusing to the reader of this work. In our original plan it was intended that this be just one sector containing all industries n.e.c. However, after further study of the nature of the miscellaneous contribution to such items as administration, it was decided that these inputs would be more realistically described

as coming from Metallic Manufacturing and from Wood, Leather, Paper, etc. (Sectors 18 and 19) as well as Miscellaneous (Sector 20). Thus all miscellaneous inputs, having been totalled, were then assigned an origin of 50% Sector 19 and 25% each Sectors 18 and 20. In the cases where the user was one of these sectors, the miscellaneous inputs were dropped by the amount of the intrasector transfer.

Before discussing the treatment of the data forms themselves, let us turn to a large area which required special treatment--small industry.

A substantial portion of the industry of Nigeria is of the very small firm type, particularly one and two-man establishments. By Okigbo estimates they make up 60% of the industrial product of the nation. For these we could not hope to have a complete set of accounts, there are probably on the order of 160 thousand of them. What we did have were scattered surveys, both as to number and cost structure for all the industries involved. Probably the most complete is a numerical (with some unpublished cost data) survey of a number of towns in the Eastern Region of the country. This was done under the auspices of AID during the summer of 1961 and, as far as can be determined, is a complete industrial enumeration of the towns listed. The survey comes up with about 11,000 firms covering 35 industries in 14 towns. It was on this survey that we based our small industry projections.

The first piece of data that was needed was an estimate of how much of the region was covered in the survey. We assumed that industrial activity takes place only in the urban areas, and this would seem to be borne out by observation (except possibly for the omnipresent bicycle repairer who seems to be in every collection of houses, no matter how small). The next step was to calculate the urban population of the region and that of the towns

covered in the survey. Relying on the portions listed in the 1952 census, we came up with the relationship that the towns covered have about 33% of the urban population of the region. From this we got "an Eastern Region Factor" and then, computing the ratio of urban populations for the other regions, we came up with factors for those regions as well. However, these all had to be modified to account for the differing patterns of industry in the regions, and here we used the "craftsmen" figures contained in the census, and applied the ratio of craftsmen/urban population to each regional ratio. But this was not all. At this point we had numerical counts of the firms in the country, but no idea of the relative productivities of firms as compared between regions. Here we called on the wage rate computed from the data in Okigbo. Finally, we added in Lagos from the survey of that city, done by the Ministry of Commerce and Industry in about 1957-58. We assumed that this survey covered about 60% of the firms in existence.

Thus the final adjustments come out as follows:

North	9.6
East	3.0
West	3.3
South C.	.5
	16.5 plus Lagos.

At this point we were ready to work on the actual figures. It will be noted[1] that the Eastern Region survey divides the enumeration by firm size so that there are four separate groups, 1 worker, 2-5 workers, 6-9 workers, and 10 plus workers. This grouping was applied to all the different industries covered. Thus in the actual projection each of the four groupings was multiplied by our

[1] "The Development of Small Industry in Eastern Nigeria," by Kilby, P. U.S.A.I.D., Industrial Development Division, March 1962.

factor above. Then, using each of the four numbers thus obtained, we worked upon the cost factors for each size group; luckily, in virtually all industries there was enough data so that each size group had several examples in it. Only after each of the four size group costs had been calculated were all costs put together for an industry total.

In practice, however, these small industry calculations often produced substantial disagreement with other data, thus we were forced to modify some of the estimates. In all cases we retained the cost structures of the survey and projected upon them either by using the ratios developed above, or by working with a known input.

As a final part of this chapter on methods, let us turn to an example of the Department of Statistics ES-31 Form, from which a large part of our industrial input-output information was derived, and demonstrate the process by which an account was transformed into a flow account. Figure one shows the entries from the form which were used. We shall assume that the industry processes agricultural materials into consumer goods and that it is for the same time period as our base year.

Inputs		
Raw Materials	4194000 lbs	£ 300510
Other Materials		9740
Packing Materials		1932
Coal	1250 Tons	5680
Electricity	4500000	59643
Water		1178
Interest		49945
Insurance		441
Administration		56480
Repairs: Building		2293
Plant and Machinery		31266
Vehicles		1000
Outputs		
Produced	£ 989000	Sold £ 898600

Figure 1 - Input-output Data in Raw Form. Company X

Our first step is to assign the output to consumption. This is not the price that is actually paid by the consumers, as there are service, trade and transport differentials to be added. However, as far as company X is concerned, this is the price at which they sell to the customer. Thus our first entry:

Output to Consumption 898.6

Next, let us look at the utilities and coal. We know from the coal accounts that the pithead price is £ 2.5 per ton and thus the cost of coal to X is £ 3125, the rest being transport. Thus we get:

	Coal	3.1
	Transport	2.6
Also:	Utilities	60.8

Next we look at repairs, and, remembering our decisions as to allocation, produce this:

Transport Equipment	1.0
Metallic Manufacturing	31.2
Construction	2.3

Interest and insurance are special items, and there is always some doubt about the exact nature of these items. For our study we chose to regard interest as part of value-added and thus not an input, while insurance was placed in the service industry:

Service .4

Other materials and packing materials present some problem in that they may or may not be imported goods. In almost every case such items were handled using particular knowledge of the industry and of the nature of the corollary inputs. Here let us regard them as being of import origin. The packing a direct import:

Imports	1.5
Service	.2
Transport	.2

and the "other materials" as local of import origin

Imports	4.9
Trade	2.4
Service	1.0
Transport	1.4

Administration is treated in the standard manner

Service	22.6
Imports	11.3
Trade	5.6
Transport	5.6
Miscellaneous	11.4

Now, as for the raw material inputs, the allocation depends largely on the information we have from other sources about the commodity. Sometimes we have market prices, in other cases there are Marketing Board reports. Let us assume in this case that we know nothing about the inputs, thus we shall simply take 30% off for the distributive factors:

Agriculture	210.2
Trade	30.1
Transport	30.1
Service	30.1

and this completes the allocation as far as this particular industry is concerned. We should note, however, that Miscellaneous is actually a composite transfer, but it is not broken down until the economy transfer table is compiled. Figure 2 thus shows the flow account for Company X exactly as it would appear in the sector accounts of Chapter VII. It should be remembered that in all cases the accounts of that chapter are for more than one firm, so our Company X would have its flow accounts combined with those of other companies before presentation.

Inputs		Outputs	
Coal	3.1	To Consumption	898.6
Utilities	60.8		
Transport Equipment	1.0		469.6
Metallic Manufacturing	31.2		
Construction	2.3	Value Added	429.0
Agriculture	210.2		
Miscellaneous	11.4		
Transport	39.9		
Trade	38.1		
Service	53.9		
Imports	17.7		
	469.6		

Figure 2 - Input-output Flow Account. Company X

Now, having described the many details of data gathering and manipulation, we can proceed to the actual study and the actual accounts involved.

CHAPTER VI

SECTORS AND THEIR MAKEUP

In this Chapter we discuss the twenty sectors that were finally decided upon in forming the matrix and what exactly went into making up these sectors.

First, let us note that these twenty sectors, all concerned with producing processes in the Nigerian economy, cover all the economic activity therein, except for the value-added by the governments and by the marketing boards. The former is easily explained, as this is traditionally left out of the intermediate sectors of an input-output analysis as are the purely receptive sectors of export, consumption, and investment; by receptive we mean that they consume but do not produce anything of non-primary nature. The omission of the marketing boards from our intermediate sectors is perhaps open to argument. However, we chose to follow the reasoning of most Nigerian economists and regard the boards as taxing organizations rather than as agricultural or service bodies. We should also note here that some of the government activities that actually produce, such as the map-making department and the vaccine producing stations have been included in the intermediate sectors, as they are activities that are in some economies undertaken by private organizations; at Nigeria's present stage of development these activities could not be profitably run by private firms.

Thus we have defined the scope of our twenty sectors by taking the whole economy and stating what is not in the sectors. We should also note that taking the sum of the value-added in each of the sectors and adding to it the value added by government and marketing boards will give us the gross domestic product at factor cost.

Let us quickly turn to the sectors themselves and identify them and their contents. This having been done, we shall then have the framework for the presentation of the bulk of the study; the individual accounts and the various tables.

Sector 1. Agriculture. This sector is very narrowly defined here and most of it is involved in the subsistence area of the economy. It includes all vegetable products, except the products of the forest, but it does not include any organized processing. Thus groundnuts are included through the decortication stage as all of this is on a hand or semi-hand basis. Cotton, however, is included only up to the time it reaches the gin, as further processing is mechanical. Mixtures of hand and mechanical processing, such as palm products, have been treated as all mechanical, the palm account in agriculture ending at the oil expelling process. Also included within the agriculture sector, and accounting for most of the identifiable inputs, are the several plantations, a number of which were not actually yet producing at the time of the study.

2. Livestock, Fishing, and Forestry. Here the same hand/mechanical division holds, except that it occurs after the livestock are slaughtered, the fish landed, and the trees presented to the sawyers. Thus sectors 1 and 2 cover all the animal and vegetable products in their primary state. Livestock is included to the point of division of the animal into the various products, meat, hides, etc. Forestry covers all wood up to the time it appears as export logs, sawmill logs, or firewood.

3. Agricultural Processing. This sector takes the products of sectors 1 and 2 and converts them, primarily for export. Here we have the processing of export crops such as cotton and palm oil, as well as the sawing of wood

and the tanning of leather. The only processing of products of agriculture not included here is that of food and tobacco.

4. Textiles. This sector includes only the making of cloth. Its largest single input is thus cotton from the ginneries and the activity is confined to the three large firms, a good number of medium firms, and countless small village looms.

5. Apparel. This covers all the manufacture of clothing and shoes. Its sources of supply are the textiles industry, the import of bolts of cloth, and leather.

6. Beer and Tobacco. This sector covers all manufactured drink, alcoholic and soft, as well as the manufacture of cigars and cigarettes. Palm wine, although quite alcoholic, is included in Agriculture.

7. Food. A straightforward grouping. This includes any foodstuffs that require formal processing before consumption. Notable members are bread and margarine.

8. Metal Mining. This sector is mainly concerned with the tin mines on the Jos Plateau. However, it includes the mining of other metals, such as gold.

9. Non-metal Mining. This covers all the mineral extraction not included in sector 8. Thus we have here coal, petroleum, limestone, sand stone, and gravel, etc.

10. Chemicals. Not really an accurate description of the contents, the chemical industry in Nigeria has hardly begun to develop. The major member of this sector is soap, others include bitumen processing, and carbon dioxide.

11. Transport. An obvious grouping, we only hope that we have accounted for all of it. This sector forms some 20% of the non-agricultural economy.

We have included not only the formal means of transport, but also some estimate of the canoe traffic on the nation's waterways.

12. Utilities. This account is for the generation of electricity by the ECN and by the large private producers, the generation of electricity by small scattered private units was not considered. Also in this sector are the estimated combined accounts for municipal water supplies.

13. Trade. This is a rather diffuse sector and it fades in some places into the service sector. We have attempted to include only that portion of distribution actually concerned with the buying and selling of goods. A more precise description occurs in our discussion at the end of Chapter VII.

14. Construction. Reasonably self-explanatory, about 5% of GNP, this sector's outputs are primarily to investment. Where a transfer from construction to an intermediate sector occurs, it is usually for the repair of buildings and grounds. Land clearing is also included in construction.

15. Service. Although this merges rather diffusely with trade, it contains some rather definite activities. Missions, the professions, banking, and domestic service are included. Other parts are ownership of buildings, entertainment, buying agencies for export crops, and the non-cash hewing of wood and drawing of water. Service accounts for 10% of GNP.

16. Transport Equipment. Except for some isolated vehicle assembly, and a bit of boat building, this sector is mainly concerned with the repair of transport equipment.

17. Non-metallic Mineral Manufacturing. A rather specialized sector containing pottery and cement making.

18. Metallic Manufacturing. Here we have the large manufacturers of metal goods such as structures, tanks, and drums, as well as the smaller

craftsmen who turn out ornamental ironwork, hinges, and spikes. Bicycle assembly and nail manufacture are also included.

19. Manufactures of Wood, Leather, Rubber, Plastic, and Paper. These industries are grouped here as they seem to be the major industries left over after the first 18 sectors. In a larger economy each would deserve a sector to itself. Even in combination these industries only account for 1% of GNP. Probably the largest single member is wood manufactures, as this covers all forms of carpentry and furniture making.

20. Miscellaneous. This is the collection of the left over industries. Here we have such things as perfume and mattresses. As we noted in Chapter V, transfers from Miscellaneous recorded in the tables of Chapter VII are not entirely concerned with sector 20. Rather they cover sectors 18-20 in a specific proportion.

Thus we have our 20 sectors and with them in mind we now proceed to present the detailed analysis of this paper. It should be noted that these sectors do not conform exactly to the I.S.I.C. classifications, nor to other Nigerian studies. They represent our judgement as to the manner in which the economy should be split. The principal differences between our sectors and those of Okigbo are as follows. First the crafts have been assigned to sectors by nature of product, rather than being put together. Second we have created the agricultural processing sector, at the same time combining livestock, fishing and forestry for lack of decent input-output data to keep them separate. Third, our definition of trade is much narrower, and finally, we have added to service a number of activities that the AID report[1] suggested had been omitted from the Okigbo work.

[1] This is taken from the Report of the First AID Mission to Nigeria, p. 52-53. Dr. Rivkin, who prepared the report, suggests that Okigbo left out some £ 17 million for locally gathered firewood, £ 1.5 million for entertainment, and £ 10 million for intra-household services. We have taken his suggestion and inserted these figures back into Okigbo before making our projections.

CHAPTER VII

INTER-INDUSTRY FLOW ACCOUNTS

This chapter contains most of our analysis; the separate accounting, as far as is possible, of each individual industry. It is from these accounts that we have made up the input-output matrices, and it was with these accounts that the majority of time and effort involved was spent.

There may be some question as to why the accounts are presented at all. From the researcher's point of view the presentation of his detailed calculations in such a form makes him rather prone to be questioned on the accuracy of his analysis, and one set of dubious figures may tend to cast a doubting light on the whole study. From the reader's point of view the tables are long, and possibly of little use to anyone except an analyst concerned with detail. The members of the various industries may not appreciate having their cost structures, even in aggregate form, presented to the general public. Yet the presentation of the accounts fills a very definite function, that of making this analysis not a static one-time study, but a piece of work that can be constantly revised as information becomes available without having to redo the entire study, or even a sector. In addition, as will be noticed, most of the accounts are accompanied by a reasonably detailed discussion of the data used to obtain the figures, and the methods employed to transform the data into usable form. Some of the methods would as a matter of course occur to a subsequent researcher, others however may offer a different, and not previously conceived of, approach. In some cases the approach of this study may prove to be inadequate, and thus a more sophisticated method may be immediately substituted in the particular industry concerned. Another use of

the individual accounts might be that of a need for quantitative information about a particular industry, more detailed than that available in the national income data, but not so complete as to warrant a field survey of the industry. Our accounts contain such data, in reasonably usable form, together with value-added figures. Presentation of the accounts of each industry in detailed form thus fits the general purpose of this present work which is to create a tool, a working model, and an information source, rather than a monolithic work of no practical value.

At this point it might be appropriate to discuss the form of the accounts and some of the notations used.* First, it will be noted that the accounts are arranged in groups corresponding to the various sectors. Each separate account is titled according to the industry covered, and beneath the actual figures will usually be found a description of the industry, the extent of coverage of the particular account, the sources of data, the methods of transformation and a certain number of value judgements as to the reliability of the figures presented. As is the custom in most input-output analyses, figures are in money units, in this study they appear as thousands of pounds (Nigerian), and are rounded off at the nearest hundred pounds. It may be likely that the data in the majority of cases do not warrant the last place figures, but in some cases there is accurate information to the hundred pound range. Thus most data is presented this way for the sake of uniformity. Transfers are labelled according to the sectors to which they go and the sectors from which they come. Where more identification than the sector is warranted, the origin and destination are listed as industries within the sectors. Emphasis here is placed on the inputs rather than the outputs as the accounts from

* See also Chapters V and VI.

which the data was gathered are oriented towards costs rather than customers.

Accounts are presented on a double entry basis with inputs on the left and outputs on the right. Where there are no inputs, outputs appear in the center. A third entry associated with double entries (particularly in the agricultural accounts) refers to exporting costs of the commodity. Since this is usually a mixture of Transport, Trade, and Service, it is listed with the commodity involved rather than as a separate entry under the three industries involved.

Sector 1. Agriculture

Groundnuts (Peanuts)

Exports	15,846.4
To Agricultural Manufacturing (Groundnut Crushing)	4,992.6
To Consumption	4,725.0
Value Added	25,564.0

Export of Groundnuts

Service Exports	1,731.6
Transport Exports	3,813.3
Service Imports (Bags and Insecticide)	1,024.7
Service from Miscellaneous (Tarpaulins)	67.3
Service from Transport	345.1

Groundnuts are one of the principal crops of Nigeria and the principal product of the Northern Region. (There is a minute amount grown in the East). Most of the crop comes from the Kano area--within a radius of one hundred miles of the town--but a significant fraction comes from the Rivers area, particularly the Upper Benue in Adamawa Province.

In these accounts we had a problem of inventories. Far more was exported in the study year than was bought from the farmers. Thus it was assumed that all the exported nuts plus the nuts sold to local processors during the study year were also bought from the farmers in that same year. Having the tonnages for the several nut destinations, ratios with stated tonnages in the marketing-board reports were prepared and the ratios then applied to items of cost. The transport figure thus obtained checks very closely with the stated figure in the Railway Corporation report for the study year, the correspondence is even closer when the assumption is made that the crop from the Rivers area went out by water. It was assumed that the buying allowance was made up of 30% bags cost and 10% transport cost.

There were also some special fees associated with storage of the crop while it was waiting to be evacuated. Most of the crop is bought in November to March; it then has to wait, sometimes up to a year, for space on the railway to take it to the ocean. These extra charges fell into the categories of inspection (service), tarpaulins, and pest control. The tarpaulins can be considered as coming from the miscellaneous manufacturing sector as there are firms in the country making them, particularly in Kano where the groundnuts are stored. Of the pest control costs, it was estimated that about 50% was for imported insecticide.

It is also estimated that about 150,000 tons of groundnuts are retained locally for eating or replanting. It is known[1] that there are about 1,630,000 acres under cultivation and that each acre takes about 20 lbs. of seed. Thus about 15,000 tons of nuts go to seed, the other 135,000 go to consumption. Valuing them at £ 35 per ton (the price of standard is £ 30, of premium £ 45, most of the crop is now premium, but some of the unbought crop would probably not get the £ 45 price) gives the transfer to consumption.

In theory there ought to be an account for the decortication of groundnuts, as all the nuts appear at the marketing board in unshelled form. A lot of the shelling is done by hand and some is done with the aid of hand-powered machines. However, since none of it is done on a formal manufacturing basis, (as is the case with palm products) we have no real data for the value-added by this process and thus it has all been left in the agricultural sector.

Cocoa

Agriculture Exports	19,579.7

Export of Cocoa

Service Exports	1,729.4
Service Imports (Bags)	183.0
Transport Exports	232.7

Here again we run into inventory problems. Far more was bought from the farmers than was actually exported by the marketing boards. This was caused by the advent of a record crop at a time when the price on the world market was rapidly falling (Nigeria produces about 1/5 of the world's production and thus can easily affect the market) causing the boards to hold onto an inventory.

Virtually all the crop comes from the Western Region with small amounts being grown in the Southern Cameroons and in Kabba Province in the north. Elsewhere the soil is too dry or too sandy to support cocoa. After being picked in the pod from the tree, there is a considerable curing process that must take place before the crop can be sold. As this is essentially a hand process, we have considered it to be entirely within the agricultural sector, and thus it does not appear in the sector accounts.

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[1]FAO Study of the Northern Region, p. 41.

One indefinite part of this set of accounts is the large number of seedlings that are "distributed" by the government to the farmers. We have assumed that their value was equal to that of the produce tax.

The rest of the calculations were straightforward, and were derived from marketing board reports using the ratio method. It was assumed that the inventory was held entirely within the Western Region. As it was known that it takes sixteen bags to cover a ton of cocoa, accurate bag costs as a part of the buying allowance could be calculated.

It is quite probable that most of the insecticide imported into Nigeria went to the cocoa farmers, however this item has been included elsewhere as a general agricultural import. The entire crop is exported, there being no local use of cocoa.

Palm Products

Output to Agricultural Manufacturing	10,725.0

This is the most important crop of the Eastern Region, although a large number of palm kernals come from the Western Region. While the entire output is included in the agricultural manufacturing sector, the account above represents only bunches of fruit prior to processing.

Cotton

Inputs		Outputs	
From Agricultural Processing	94.9	To Agricultural Processing	3,658.1
From Service	137.1	To Domestic Cloth Manufacturing	2,060.0
	232.0		5,718.1
	5,718.1		
Value Added	5,436.1		

This account covers only the cotton grown in Nigeria and is from the point of growing to the point of sale to the ginneries or to local users. The amount to domestic cloth making represents about 1/3 of the cotton supply that never reaches the marketing boards and thus is assumed to go into local clothes. The transfer of 94.9 represents the value of the seed which is given free to the farmers by the ginneries (actually the marketing boards, but physically from the ginneries). The service entry is from the ginnery accounts and is presumed to be services other than ginning done by the gins for the farmers, possibly storage; however, this is pure conjecture. For more details on the sources of data and the methods of estimation, see the ginning account (sector 3).

Rubber Growing

Inputs		Outputs	
Electric	1.5	Agricultural Manufacturing	7,995.4
Imports	288.2		364.3
Transport	36.8	Value Added	7,631.1
Service	37.8		
	364.3		

This covers the growing and tapping of rubber. The figures for imports, service, and transport are for the whole industry. The additional figures cover the study year expenses for the Eastern Region plantation near Calabar. Other plantation expenses have been included in other agricultural accounts, as most plantations produce several products and there is no accurate way to allocate costs. However, as all are in the same sector, the allocation does not matter.

Benniseed

Exports	829.1	Marketing of Benniseed	
		Service Exports	120.3
		Transport Exports	156.6

Benniseed, otherwise known as sesame, is a traditional Tiv crop and a minor export of Nigeria. It is grown in the southeastern part of the Northern Region along the Benue valley, also in Ogoja Province of the Eastern Region. Total exports are usually about 20,000 tons a year and this figure is rising. The average price paid to the farmer is about £ 40 per ton and the F.O.B. price about £ 60. Evacuation of the crop is either by rail to Port Harcourt or by water to the Delta ports of Warri and Burutu.

The above data is from marketing board reports; the only adjustments necessary were to change the time period of the data.

Soya Beans

Exports	74.1	Marketing of Soya Beans	
		Service Exports	23.1
		Transport Exports	19.8

This is another crop of the Tiv riverain area, but not as popular as Benniseed, exports being only 10,000 tons in a good year. In the period under review soyas had one of the worst years on record, sales to the marketing boards being only 3,600 tons. Recently the figure has been rising; some 13,000 tons were exported in 1961. Average prices to the farmers have been £ 20 and F.O.B. prices about £ 37. Calculations were made in the same manner as Benniseed above.

Shea Nuts

Exports	176.2	Marketing of Shea Nuts	
		Service Exports	16.4
		Transport Exports	35.8

This is a minor tree crop of the "middle belt" area of the Northern Region.

Palm Wine

Output to Consumption	5,000.0

This figure comes directly from the EPU projections of Okigbo's data. The fermented sap of the palm tree is a popular, inexpensive, and alcoholic drink.

Coffee, Copra, Ginger

Exports	1,097.6	Marketing Costs	
		Transport Exports	142.4
		Service Exports	167.3
		Service from Trade	8.2
		Service from Imports	29.2
		Service from Transport	7.0

These figures are for the exports of these crops only. Domestic usage has been included with the miscellaneous section of indigenous agriculture. For these items, standard breakdowns have been assumed, as very little information, other than export figures, was available. The figures for imports by service and payments to the trade sector are a representation of the materials needed to bag and pack the commodities prior to shipment.

Coffee is a crop that is now almost insignificant in Nigeria. In spite of the fact that there is a certain amount of coffee growing in the southern regions of Nigeria, most of the exports (4,000 tons/p.a.) came from the Southern Cameroons and thus are no longer counted with Nigeria. The remaining coffee now (1963) being exported from Nigeria comes from the plateau regions of the North and amounts to about 500 tons/p.a.

Ginger exports from Nigeria are about 1,100 tons/p.a. This figure seems to be growing slowly. The crop is grown to the west of the Plateau in that part of Zaria province lying between Kaduna and Kafanchan.

Copra, a product of the coconut palms that lie near the ocean seems to have declined sharply as an export since the record year of 1959. At one time this crop amounted to over 8,000 tons, but recently it has barely been 2,000. Of this amount some 60% came from the East. The crop was, in fact, so encouraging that in 1959 the E.R.M.B. decided to initiate a marketing scheme for copra. In

the first year they bought about 4,500 tons, but subsequent years have yielded only about 100 tons. There are several possible explanations for this sharp decline, the most plausible being that the Marketing Board price was too low to induce sales to the Board, and since the Board monopoly prevented exports from the region without its consent, other, higher paying, uses were found for the coconuts. These uses would include the manufacture of coir and the shipping of coconuts as food to the Northern Region. It is possible that the departure of the Southern Cameroons brought about some of the decline, but this would not account for all of it. It is also just feasible that the copra was smuggled to Fernando Poo to fetch a higher price.

Non-edible Materials

To Mattress Making	14.3
To Tanning	18.3
	32.6

Mattress stuffing and tanning materials are covered in this account.

Tobacco

Outputs

To Tobacco Manufacturing	282.6
To Consumption	74.4
	357.0

For an explanation of these figures see the tobacco manufacturing account (sector 6).

Kola Nuts

Outputs		Marketing of Exports	
To Consumption	5,296.0	Transport Exports	1.0
Exports	12.3	Service Exports	.5

In this case the procedure of Okigbo[1] was more or less followed, using the shipments of kolas to the Northern Region as an over-all indication of production. In this manner the crop in 1959/60 was estimated to be 93,100 tons, of which 340 tons were exported. This represents a drop in the production of nuts since 1957. However, the price seems to have risen substantially. Okigbo records no change in the producer price of £ 46 a ton between 1950 and 1957 and this is reasonably well verified by the consumer price indices covering part of this period. However, the consumer indices rise sharply after 1957, in some cases as much as 83%. The average rise is about 25%, so the price of kolas in

[1] Okigbo, op. cit., p. 67.

1959/60 is assumed to be £ 57, producing an output of £ 5,310. The service and transport amounts are estimates of their share of the export figure and have been subtracted from the total export value.

Agriculture for Local Consumption

Root Crops	
To Consumption	200,000
To Food	2,000
Beans, etc.	
To Consumption	28,658.0
To Food	142.0
Cereals	
To Consumption	136,451.1
To Rice Milling and Corn Milling	341.3
To Vaccine Production	7.6

These estimates are derived from those of Okigbo,[1] 1950-1957, by a simple linear extension through the minimums during the last ten-year period. Naturally, the errors introduced are rather large, but so are those from any other method of estimation. Roots for example could be as high as 223 million or as low as 185 million when calculated on a standard deviation basis. Stolper,[2] in his estimates for the Development Plan, assumes a simple 10 million rise in the over-all subsistence total after 1957 and then no change. The above estimates produce a 13 million rise by 1960.

Bananas and Plantains

Outputs		Inputs (Plantation Expenses)	
Agriculture Exports	2,285.1	Service	57.1
To Consumption	5,600.0	Transport	57.1
	7,885.1	Imports	457.1
	571.3		571.3
	7,313.8		

Most of this crop comes from the Southern Cameroons. With the departure of that territory, Nigeria is no longer a significant producer of bananas for export, although there is a large amount grown for internal consumption. Export production in the study year was almost 70,000 tons, at present (1963) it is only a few hundred tons.

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1 Okigbo, op. cit., p. 37.

2 E. P. U., Extension of Okigbo data.

The figures were obtained from the export data. There is an export duty which had to be subtracted and this is reckoned in "count bunches." Count bunch data for the study year was not published, but it did exist for the years 1954-58 along with corresponding tonnages. In this way an average count-bunch/ton ratio was found (about 50)* and applied to the 1959/60 tonnages to get the duty. Then it was assumed that the average transport charges amounted to about £ 1 per ton (10 d per ton mile, about 25 miles average from Victoria, the exporting port in Southern Cameroons). The remainder thus became agriculture exports. Expenses are for the plantations only. It was assumed that 25% of banana cost went to supplies. The local consumption figure was taken directly from Okigbo.

Miscellaneous Vegetable Products

Agriculture Exports	576.3	Export Costs	
		Transport Exports	40.1
		Trade Exports	40.1
		Service Exports	40.1

This account, a collection of agricultural exports, not elsewhere classified, was treated by assigning 70% agriculture and 10% each transport, service and trade.

Agriculture - General Inputs

Imports	389.0
Trade	55.5
Transport	55.5
Service	55.5

This account is for various small inputs to agriculture, mainly small tools. We have assumed that 1/2 the imports of machetes and 1/2 the imports of hand tools go into the agricultural sector after a mark-up of 10% each to trade, transport, and service.

Imports	936.3
Transport	133.8
Trade	133.8
Service	133.8
Livestock	10.0

This account covers the import and usage of insecticides, fertilizers, and seed by agriculture. The figures are from the import statistics; there is no duty collected on the items. The usual trade, transport, and service percentages have been added. The livestock figure is for local fertilizer from blood and bones.

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* With the poorer quality Nigerian bananas being the only export, the count-bunch/ton ratio is now up to 185.

Sector 2. Livestock, Fishing, Forestry

Cattle and Cattle Products

Inputs		Outputs	
Imports	4,289.7	Exports	808.9
Transport	506.4	Consumption	13,680.6
Feed from Gnut Millers	447.0	Food Processing	570.8
Vaccine	35.3	Tanning	90.3
	5,278.4	Agriculture	10.0
	15,235.8	Vaccine	7.6
Value Added	9,957.4	Miscellaneous - Sector 19	67.6
			15,235.8

For the cattle accounts we followed the Okigbo[1] method to a certain extent, adding some information from sources like the FAO[2] report, etc. The starting point was hides. Assuming that 5/6 of Nigerian production is exported and that 1/6 of exports are of French Territory origin and figuring the average hide to weigh 13 lbs., we arrived at the figure for number of head slaughtered. Now, 70% of the slaughter is not done in official points and thus the hides are not usually treated correctly. Although all hides were valued at flaying at the "green abatoir" price, only the officially slaughtered ones were valued at "suspension dried prices" after treatment. The rest of the hides were valued at "ordinary" prices including the 1/6 of production that went to the local tanners. The import figure to hide preparation is an estimate of the cost of sodium arsenate used for treatment. It will be seen that a rather large margin (if we are to believe published buying prices) is placed on the export hides between purchase by the trading companies and export.

After Okigbo,[3] we assumed 250 lbs. of meat per carcass and a value of one shilling per pound. The small amount of blood and bones turned into fertilizer is the explanation for the output to agriculture.

Throughout the cattle area the custom exists of the farmer paying the herdsman to keep his cattle on the plot overnight, thus manuring it. In effect the farmer is also paying the amount of grass and fodder the cattle consume while there. As there is no real way of valuing this transaction, it has been left out.

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[1] Okigbo, p. 72.

[2] "Report on the Agricultural Survey of Northern Region of Nigeria" by the FAO/ICA, Kaduna, Nigeria, December, 1960.

[3] Okigbo, op. cit. p. 71.

Marketing For Export

Transport Exports	111.2
Service Exports	20.8
Trade Exports	756.6

Transport on the hides was valued from the railway tariff rather than from the annual report of the railway, because the latter lumps cow hides with sheep and goat skins. The same applies to transport of cows south for slaughter and for export.

Hides in Transit from French Territory

Trade Exports	77.7
Service Exports	4.2
Transport Exports	13.2

As was explained in Chapter V, French Territory imports have been netted out from the export figures.

Sheep and Goats

Outputs		Marketing for Export	
To Consumption	7,320.0	Service Export	161.4
To Tanning	242.1	Transport Export	38.8
To Export	1,821.5	Trade Export	95.5
	9,383.6		

Our base figure here was the export of sheep and goat hides. Using the formula in Okigbo,[1] we came up with an estimate of imports of skins from French Territory, and the amount of skins sold to local tanners. The railway tariff gives the cost of getting the skins from (we assume one point) Kano to the seaports. The difference between the export less duty less transport, and the buying price for export skins in Kano is considered as the service industry export. The trade figure comes from the difference between the assumed entry price of French skins and the Kano buying price. As the hides from the French Territory are actually in transit even though they enter the Nigerian markets and export system, they have been subtracted from the export figure. As the export figures are in cwt, we had to refer again to Okigbo,[2] obtaining a weight per skin of 2 lbs. for the sheep and 1 1/4 for the goats. The total production of skins in Nigeria obtained this way is in extremely close agreement with figures from other sources

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[1] Okigbo, op. cit. p. 72.

[2] Ibid, p. 74, derived from figures in Table VI - 26.

that claim a slaughter of 5 million goats, and 700 thousand sheep.[1] As in Okigbo, we assumed 25 lbs. per carcase to get a meat figure, but raised the price by referring to the percentage rise in consumer meat prices as revealed in the urban consumer studies.[2]

Goat Milk

To Consumption	6,600.0

This figure is directly from Okigbo with no change assumed.

Cow's Milk

To Consumption	6,784.5
To Butter	5,238.4
To Dried Milk	.2
	12,023.1

Here we followed the Okigbo[3] method and, as he did, added a constant number of cows to the herd each year and assumed that 30% of them are milkers each giving 50 gallons a year. We also assumed a price rise for milk following the trend set between 1950 and 1957 in a linear manner.

Poultry and Eggs

To Consumption	10,180.0

Here again, the figures are based on Okigbo,[4] one difference being an assumed 5% rise in prices. This is an industry, however, that will change in structure in the near future. Since 1960 a number of commercial farms have sprung up, attracted by the huge potential profits, the examples set by agricultural demonstrations, and the success of poultry on a commercial basis in Ghana. We have thus assumed a 10% rise in production arising from the commercial farms. This industry is quite common in the Western Region near Lagos.

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[1] Many sources, especially "Handbook of Commercial Industry," Fourth Edition, p. 130.

[2] "Annual Abstract of Statistics Federation of Nigeria," 1961, pp. 47-48.

[3] Okigbo, op. cit., p. 72.

[4] Okigbo, op. cit., pp. 73-84.

Pigs

Inputs		Outputs	
From Groundnut Millers	136.6	To Organized Meat Manufacturers	
Electricity	.2	(in Lagos)	259.5
Imports	.9	To Consumption	221.2
Service	.6		480.7
Transport	.1		139.3
Construction (repair)	.4	Value Added	341.4
Transport Equipment (vehicle repair)	.5		
	139.3		

The detailed accounts are for the two known organized piggeries in the Northern Region. Total output is derived from Okigbo[1] and was assumed to be 45,000 pigs per year, of which 25,000 are shipped to the organized meat manufacturers in Lagos, the remainder, which we assumed to be valued at £ 10 per animal, are slaughtered in the normal way in the South. The input from the groundnut millers is for groundnut cake feed for the organized farms.

The meat to consumption figure was derived from Okigbo,[2] using also his assumption of 140 lbs. of meat per pig.

Miscellaneous Animal Products

Livestock	246.1
Transport Exports	33.5
Trade Exports	33.5
Service Exports	33.5

This account is for the items on the export lists that are not elsewhere classified in this study. They include such things as reptile skins, furs, and waxes. The estimated components of the exports are 10% each for trade, transport and service, and the other 70% from livestock.

Fishing

Inputs		Outputs	
Imports	340.0	To Consumption	14,725.0
Service	37.0	Export	.9
	377.0	To Lime Manufacturing	.2
	14,726.1		14,726.1
Value Added	14,349.1		

This is an extremely crude calculation, based mainly on Okigbo,[3] with a

[1] Okigbo, op. cit., p. 74.
[2] Ibid, 74.
[3] Ibid, 75.

small amount of additional data from one of the five or so commercial fishing companies in the country. The output figure is a linear extension of the Okigbo figure, the inputs are a five times ratio on the costs of the commercial company, plus a figure for fishing nets from the import lists. The total is assumed to have a 10% service charge.

Forestry

Inputs		Outputs	
Imports	212.9	To Mining (Pit props)	8.7
Trade	30.4	To Coal (Pit props)	3.0
Transport	30.4	To Export	3,313.5
Service	30.4	To Sawmills	1,310.6
	304.1	Hand Sawyers	3,986.4
	30,567.9	Construction	1,700.8
Value Added	30,263.8	To Consumption (Firewood)	19,079.9
		Intermediate uses of Firewood	914.7
(Royalties Paid to Government	477.8)	Intermediate uses of Wood	250.3
			30,567.9

These figures were derived from the physical flows involved. The wood was valued at £ .0875 (1/9) per cubic foot. The exception was the export figure whose value is £ .1545 per cubic foot.

The inputs are for the various small tool inputs to forestry. We assumed that 90% of the axes and hatchets, 50% of the machetes, and 15% of the hand tools imported into Nigeria go into this sector. There are of course the usual mark-ups on these goods between the importer and the consumer.

Associated with these accounts are payments to the transport industry. It was estimated that every piece of wood used in the country, except firewood, has to pay transport of 1/9 per cubic foot.

Transport to Export	1,881.3
Transport to Mining	3.5
To Coal	3.0
To Construction	1,700.8
To Sawmills	1,310.6
To Hand Sawyers	3,986.4
To Other Intermediate Uses of Wood	250.2

Sector 3. Agricultural Processing

Sawmills

Inputs		Outputs	
Imports	715.1	To Transport Equipment	209.3
Service	277.1	To Consumption (Firewood)	348.5
Transport	115.2	To Furniture	1,393.7
Utilities	502.5	To Export	2,230.0
Transport Equipment (Repair)	2.2	To Construction	1,837.0
Construction (Repair)	10.6	To Electricity	205.0
Metallic Manufacturing (Repair)	10.2		6,226.8
Trade	34.4		4,357.4
Miscellaneous Manufacturing	68.9	Value Added	1,869.4
From Forestry and Transport	2,621.2		
	4,357.4		

This includes all the sawmilling associated with recorded statistics. This is both the mills and also some pit sawyers, notably those near Lagos, whose output is reasonably well known. The output to electricity is that of a large mill whose electricity is generated on the spot using its own equipment and waste wood. The amount balances the company's use of electricity.

The calculated waste wood from the other companies is shown as going into firewood. This was valued at the average household firewood cost (at least in Southern Nigeria) £ .086 per cubic foot. This figure may, however, be far too high. If we are to believe a national estimate of "50 million tons" of firewood, then the cubic-foot value is about £ .002.

The costs were derived from costs sheets of about 1/2 the sawmills and recorded pit sawyers in Nigeria, by making a ratio of the outputs on the cost sheets to the total recorded output.

Hand Sawyers

Inputs		Outputs	
From Forests and Transport	7,972.8	To Consumption (Firewood)	1,312.5
	9,644.1	To Furniture	3,594.3
Value Added	1,671.3	To Construction	4,737.3
			9,644.1

This includes all the sawing and pit sawing of wood that was not recorded. It was imputed from various forestry department estimates concerning the ratio between the recorded output and probable actual output, and also from calculations of the inputs into construction and furniture. It was assumed here, as in other wood processing accounts, that the waste material went into the nation's firewood and fuel supply.

These accounts were one of the most difficult to calculate in this paper. To begin with there was a multiplicity of products, all with varying value.

Then there were a large number of firms, both recorded and unrecorded. Things would have been simple if, as in the case of rubber, all of the output was exported, or in the case of cement, all the producers were accurately known. However, with forestry and sawmilling all the constraints that can be missing are, and we were forced to rely on conjecture. Our accounts are based on several foundation stones. First, there are the department of forestry reports, then there are the export figures; next we have the accurate and complete accounts for several of the larger millers and log exporters, and a number of less accurate accounts from other millers. Also there are the Okigbo estimates of the order of magnitude, and his very helpful estimates as to firewood usage and also his estimate that the sawn and round wood output was divided roughly 2/3 to construction and 1/3 to furniture and carpentry.

The first step was to calculate an official recorded output of timber and products, and from this to calculate the physical flows of product. It was assumed that all the recorded output (except for accounts of firewood, hewn and split wood, and pit props) went to export or sawmills and known (i.e. Lagos) sawyers. Taking into account the transport charges, it was then determined that the average export lumber price is £ .523, local lumber price is £ .383, hand sawn price £ .275, and the at-stump price (except export which is higher) is £ .0875 (all values per cubic foot). Then the inputs to sawing were calculated as outlined above and in addition, information was used from "Trade Journal" articles on the industry and from actual observation by the author. This then left the vast area that was unrecorded. From one of the forestry reports it was noted that an enterprising forestry officer had made an estimate of the actual sawn timber output in his region. This was then applied to the recorded output of that region to get a ratio which was then applied to the recorded outputs of the other regions. All of this additional product went to form the hand sawing account above. Finally, it was estimated that the value of round wood used was equal to the value of the unrecorded sawn wood (with a transport adjustment). As for the allocation of output inside the country, the 2/3, 1/3 assumption was followed, assuming as well that all the hewn and split output and all the round output went to the construction industry.

The sawn timber usage estimated here is about 39 million cubic feet, and coincides well with a forestry estimate of "a plank per person per year."

Rice Milling

Inputs		Outputs	
From Agriculture	241.8	To Consumption	256.9
Metallic Manufacturing (Repair)	.1		243.6
Trade	.3	Value Added	13.3
Service	.1		
Transport	.1		
Imports	1.2		
	243.6		

These accounts are reasonably accurate, as a fairly complete listing of

rice mills was available and accounts for about half of them (admittedly rough) were available. In reality this industry is a service, since the product never enters possession of the millers, milling being done on contract. What we did here was to assume an input price of 8 d per pound. An interesting fact brought to light by these accounts is that they indicate a yearly production of about 7 1/4 million pounds of rice which is somewhat higher than an official estimate of 3 million.

Corn Milling

Inputs		Outputs	
Agriculture	99.5	To Consumption	489.1
Imports	31.0		143.4
Trade	7.7	Value Added	345.7
Metallic Manufacturing	2.6		
Service	2.6		
	143.4		

From a set of milling accounts, but not as accurate as those for rice milling. Here we had nothing more than input and output figures for each size of firm and a projection from the Eastern Region ennumeration. As was the case with rice, the industry is a service as the product belongs to someone other than the miller. The cost breakdowns have been borrowed from the rice milling account.

Leather Tanning

Inputs		Outputs	
Tanning from Agriculture	18.3	Tanning Export	288.7
Tanning from Skins and Hides	332.4	Tanning to Local Leather Users	188.7
From Metallic Manufacturing	.4	Tanning to Shoes	232.0
Utilities	1.6		709.4
Trade	.2		368.3
Transport	1.6	Value Added	341.1
Miscellaneous Manufacturing	.4		
Imports	11.9	Export Charges	
Services	1.5	Transport Export	3.6
	368.3	Service Export	12.9

These accounts are based on an assumed amount of hides from slaughter, a known amount of exports, and the accounts of the largest tannery. We assumed that all the export hides came from organized tanneries, of which there are four. Comparing the per-cent price of product at export (before duty), less the transport costs (from the railway tariff) and the recorded output price, gave us the service differential associated with export. However, the organized tanneries also produced a small amount of leather for local use; subtracting this and the export amount from the total leather production gave us

a figure for the small tanners; the only input to this was assumed to be various compounds from Agriculture, and was valued at the same portion of cost as the large tanneries. Local leather was valued at output at the same price as that of the large tanneries. Finally, we took the ratio of the tannery output on the one account available to the total export amount and applied this ratio to all costs on the account to obtain a large tannery input account. Import, local supply, and repair accounts were treated in the standard manner.

Groundnut and Other Oilseed Processing

Inputs		Outputs	
Utilities	35.3	To Food	56.3
Construction	4.8	Exports	4,799.2
Agriculture	4,992.6	To Consumption	2,360.0
Service	535.6	To Livestock and Pigs (Feed-cake)	583.6
Transport	248.0		7,799.1
Imports	292.1		6,205.9
Miscellaneous	18.1	Value Added	1,593.2
Trade	9.0		
Metallic Manufacturing	46.0		
Transport Equipment	4.4	(From Government-tax on ground-nuts)	142.0
Coal	20.0	Transport Exports	972.3
	6,205.9		

This is a consolidation of the accounts of the groundnut processors and the Northern Region experimental oilseed processing plant.

Groundnut Oil Millers: These accounts were obtained from actual records of three of the four nut millers, two of which were for the exact study period, the third was for the previous year and the assumption was made that the relative costs had not changed. From the marketing board records the amount of nuts sold to the millers was known. The amount recorded in the three accounts was combined with it to form a ratio which was then applied to all the costs to obtain an account for all four millers.

Administration was distributed by the standard method, coal from the comparison of input costs to pithead costs. Containers, which are imported, were valued by a comparison of the landed price with the input price, the difference being assigned to transport.

The last item of the outputs represents groundnut cake sold to agriculture as feed for animals, particularly in the case of one mill, whose owner also owns a large pig farm in the Northern Region. The export figures cover both groundnut oil and groundnut cake.

Experimental Agricultural Processing: This is an account for the experimental processing plant in the Northern Region. The establishment works with groundnuts and shea nuts. Its purpose is to produce and investigate better methods of processing local agricultural produce. Thus, it is not expected to turn a profit. The items are from an actual account; however, for most of the

general items the standard breakdowns have been applied. An output to Agriculture is for cattle cake made from shea nuts.

Cotton Ginning

Inputs		Outputs	
Imports - Cotton from French Territory	729.3	To Textiles	363.4
Agriculture - Nigerian Cotton	3,658.1	To Agriculture	94.9
Trade*	242.7	To Exports	5,985.3
Transport*	506.8		6,443.6
Service*	646.2		6,024.9
Imports**	185.7	Value Added	418.7
Transport**	23.7	**Export Charges**	
Service**	23.7		
Trade**	3.8	Service Export	45.7
Utilities**	4.9	Transport Export	325.2
	6,024.9		
* Distribution markup on cotton between farmers and gins.		**Buying Allowance Costs**	
		Service Imports	70.7
** Ginnery operating costs.		Service From Transport	7.1

This account covers cotton from the time it leaves the farmer to the time it is either exported in the form of lint and seed, or sold to textile makers in bales of lint. Most of the information comes from Marketing Board reports with some additional data from accounts of the ginneries. Since Marketing Board data did not coincide with the study year it was necessary to obtain average costs for each item in the board reports and apply them to the actual tonnages (available in published data) of our time period. Ginnery data was also for the crop year rather than the fiscal year, but in this instance the tonnages handled in both time periods were so nearly identical that no adjustment of figures was deemed necessary.

The first figure refers to an assumed 15,000 tons of cotton coming into Nigeria from adjacent territories. As this cotton is presumably processed in Nigeria, we list it as an import, rather than netting it out of exports as we did in the case of hides.

It was assumed that the 10% of the buying allowance went to imports, which themselves have a 10% transport component. The internal operating costs of the ginneries were taken directly from the ginning accounts. These costs include such things as fuel and materials for baling the ginned cotton.

The destination figures are self-explanatory, except possibly the 94.9 item to agriculture; this, as was explained in the cotton account, represents the value of the seed given back to the farmers to plant the new crop.

It will be noticed that although the ginneries are actually just a service organization under contract to the Marketing Board, in this study they have been treated as actually buying and selling. However, the cost added by the gins is simply their recorded fee, thus it is the Marketing Board that absorbs profits and losses of the operation.

Rubber Processing

Inputs		Outputs	
Utilities	35.5	Exports	11,619.1
Construction	35.3	To Footwear	9.4
Transport Equipment	53.4	To Foam Rubber	2.0
Metallic Manufacturing	4.7		11,630.5
Agriculture	7,995.4		8,348.9
Transport	22.6	Value Added	3,281.6
Coal	2.0		
Service	57.6		
Imports	122.9		
Miscellaneous Manufacturing	13.0	Transport Exports	18.5
Trade	6.5		
	8,348.9		

This account covers the rubber product from the time it is coagulated from latex to the time it is exported. Since most of the producers provide their own transport to export, there is only a transport charge on the exporting. Breaking the rubber accounts at the point of coagulation normally cuts across industrial and/or agricultural enterprises. However, it is the first point in the process where mechanical means enter in, and thus it is the boundary between Agriculture and Agricultural Processing. Most of the producers are located in the Mid-West Region. There are two kinds of product, depending on the tapped quality. If a tapper is careful not to let his latex coagulate, and if he has it all made into sheets, he will receive about ₤ 150 per ton, after the sheets have been smoke dried for thirty days. However, it is much easier for the tapper to coagulate all his latex into a lump (he can also hide stones in the lump to increase the apparent weight), take the lumps to a creping plant, and get his money within a day or so, but only at the rate of ₤ 135 per ton. It is the preference for the latter on the part of the individual tapper that keeps the over-all quality of Nigerian rubber low and has caused planners to look to plantations with supervised tapping as a way of increasing the earnings of the rubber crop. The creping plant takes the lumps, literally grinds out all the impurities, and then smokes the creped sheets for about three weeks before export.

The rubber business is a very confused one, and its competitive nature makes data relatively hard to get. There are probably thirty-five organizations putting out rubber on a large scale and countless small village producers (but these latter usually sell their output to large "upgraders.") Accounts were available for five crepe producers and seven sheet producers representing 14% of the sheet output and 37% of the crepe output. The above accounts were arrived at by multiplying by the ratios necessary to represent all of the

exports. This was done without adjustment of dates as it was felt that the industry is relatively stable. There is probably a certain measure of error introduced by the fact that the larger firms would naturally be the ones to make reports so that the multiplying by ratios would tend to give the smaller firms the same cost ratios as the larger ones.

The entries for Transport Equipment, Metal Manufacturing, and Construction are repair costs. Administration was broken up in the usual manner, as was imported supplies.

Finally, all the rubber is exported except for a small amount going to foam-rubber making and to shoes.

Palm Fruit, Kernels and Oil

Inputs		Outputs	
From Agriculture	10,725.0	To Consumption	7,214.6
Utilities	17.9	Kernel Exports	12,198.9
Construction	18.8	Oil Exports	8,655.6
Metallic Manufacturing	53.7	Soap	601.4
Transport Equipment	68.8	Margerine	44.6
Service	13.2		28,715.1
Imports	46.1	Exports - Kernels smuggled	
Transport	6.6	into Dahomey	863.2
	10,950.1		29,578.3
			10,950.1
		Value Added	18,628.2

Exporting Costs

Transport Exports	2,895.7
Service Exports	4,299.9
Service From Coal	27.6
Service From Electricity	8.4
Service From Imports	532.8
Service From Trade	54.1
Service From Transport	126.7
Service From Miscellaneous	.4

Palm fruits are cut from the tree in bunches and the fruits are stripped from them. Oil is prepared from the pericap of the nut by hand press, by boiling in a machine, or by boiling and skimming in a pit in the bush. Kernels are prepared by cracking the remaining nut; it is estimated that about 2/3 of the nut crop is prepared by hand cracking.

It was estimated that the mechanized millers prepared about 20% of the crop. Their costs were arrived at from actual accounts of millers, projected by ratios to the whole oil milling industry.

The unofficial export figure represents an estimated amount of kernels smuggled into Dahomey from the Western Region to take advantage of higher prices. The total kernel crop is estimated at 450,000 tons, so that taking away the sales to the soap companies and exports left an approximate smuggled figure. This was valued at £ 30 per ton, the Marketing Board price in the Western Region.

The imports to service represent the bags in which the kernels were shipped. The landed average price of bags is about 1.75 shillings each and it was estimated that they would be priced at 2/- each as they were used, the differential going to trade and transport. Since kernels are all packed with 182 1/2 pounds to the bag, it was a straightforward calculation to arrive at the bag usage and thus the portion of the buying allowance that went towards bags.

The export oil figures were reasonably difficult to come by. The Marketing Board data was not coincident to the time period of the study and thus certain adjustments had to be made. This was made doubly difficult by the fact that there are about five different types of palm oil bought, and the buying allowances, depending on the means of delivery, are about twice that number. The first step was to calculate the actual tonnages bought during the period. This should have been fairly straightforward as the Marketing Boards publish quarterly figures. However, the data for the first and second quarters of 1960 was completely in error and there was thus no direct method of getting January-March, 1960, tonnages. This situation held for all four Boards and though eventually an over-all first quarter total was found, it was necessary to break it up by regions because of the differing price and allowance structures. This was done by giving each region its historical average per ton applied to the quarter in question.

Having the tonnages, the ratio of tonnage in the study year to tonnage in the report year was computed for each Board and this ratio was applied to each item of income or expense. In the case of the oil bulking plants the actual data for the study year was available so that no difficulties were encountered in computing inputs or outputs. Coal inputs were listed in tonnages as well as value, so that an exact transport differential could be computed. Administration of the oil bulkers was broken up according to the standard method; buying allowances were handled in the same manner.

The local oil figures were arrived at on a tonnage basis by working backward from known outputs. It was known that the nut crop was about 450,000 tons, and according to Okigbo the national ratio of nuts to oil is 6:5, thus the total oil production was about 375,000 tons, which meant that the local oil consumption was about 180,000 tons. This was valued at £ 40 per ton which is the average Marketing Board offering price.

From plantation accounts it was estimated that the fruit necessary to produce one ton of oil costs £ 28.6 and thus for a ton of product (oil and kernels) the cost is about £ 13; this gave us a figure for inputs to the industry from Agriculture.

An apparent crop value of £ 28 million may seem a bit high, but it should be remembered that most of this is labor, 80% of it hand or semi-hand production.

Sector 4. Textiles - Basic

Large Textiles

Inputs		Outputs	
Agricultural Processing	363.4	To Apparel	1,163.9
Transport	21.7	To Miscellaneous	14.3
Service	36.7	Textiles Export	59.3
Coal	5.2		1,237.5
Utilities	76.8		639.6
Construction	9.8	Value Added	599.9
Metallic Manufacturing	42.7		
Transport Equipment	1.2	(From Government - Tax)	23.9
Trade	6.4		
Imports	62.9	Buying Costs	
Miscellaneous	12.8	Service Exports	1.0
	639.6	Transport Exports	.5

These accounts cover the three large textile manufacturing enterprises, in Kano, Mushin, and Kaduna. The latter two make their product from local cotton, while the Kano firm uses imported yarn. The accounts were altered slightly to fit the fiscal year, this was not needed for the Kano firm, and with the Kaduna one the two years available were exactly six months out of phase with the study year so a simple average was taken. With the Mushin firm the data was for the previous year, but since the output was small and the firm is not a growing one, it was assumed that the 1958/59 data was reasonably valid for 1959/60.

For most of the figures, the standard breakdown was used in estimating the transport, service, etc., components. The exceptions were coal where the difference between the pithead price and the users price was known, and the case of the imported yarn where a rail transport price was used rather than the standard percentage.

The output to miscellaneous is cloth for map backings, and cotton waste for mattresses and upholstery. Exports have been charged in their entirety to large manufacturers, however it is entirely possible that some of this is actually the output of hand cloth makers. This might be indicated by the fact that the average export value is three times the average F.O.B. factory value.*

Weaving and Dyeing

Inputs		Outputs	
Imports	556.8	Exports	3.0
Transport	13.3	Output to Tailoring	1,339.3
Service	55.7		1,342.3
Trade	65.9		691.7
	691.7	Value Added	650.6

* The result in either case is the same as both possible producers are within the same sector of the final table.

A rather weak calculation. Extension from the Eastern Region data did not give a decent figure. This was because the Northern Region, in particular, indulges in weaving and dyeing in a manner vastly out of proportion with the rest of the Federation. Here we could fall back on the Okigbo data,[1] but he includes figures using both the imported and the local yarn, whereas our local yarn figure is listed below in a separate account and is considerably larger than the Okigbo figure. Thus we took the approach of working with the inputs, in this case imported yarn, and imported dyes. We thus covered all the weaving except that below, and all of the dyeing. Once having determined the inputs, we then imputed the outputs using the ratios from the few accounts we had from Lagos and the Eastern Region.

Domestic Weaving

From Agriculture	2,060.0
To Tailoring - Domestic	3,988.6
Value Added	1,928.6

This account was imputed from the cotton that never reaches the Boards. The cost ratios are from the small weaving account.

Sector 5. Apparel

Domestic Tailoring

From Weaving - Domestic	3,988.6
To Consumption	10,825.1
Value Added	6,836.5

This account is for the cloth produced locally from cotton that does not go to the Marketing Boards. The ratios are from the small tailors and seamstress account.

Tailors and Seamstresses

Inputs		Outputs	
Weaving and Dyeing	1,339.3	Output to Consumption	19,448.3
Textiles	1,163.9	To Service and Trade	200.0
Imports	3,809.8		19,648.3
Trade	1,270.0		9,603.2
Service	635.0	Value Added	10,045.1
Transport	635.0		
Electricity	12.9		
Metallic Manufacturing (Repairs)	737.3		
	9,603.2		

[1] Okigbo, Op. Cit., p. 91.

Using the projections* from the eastern region counts we obtained an "equivalent" Federation count of some 57,000 establishments, of which about 1/2 are one-man establishments. The sum total of inputs and outputs, being based on actual accounts of tailors and seamstresses was thus as accurate as the numerical establishment projections. From this point we assumed that, of the larger firms (more than five employees), the amount of 1% is spent for electricity and 1% for repairs and with the small firms there is 1% spent for repair. Next we put down the inputs from weaving and dyeing. All the rest of the input was assumed to be imported material, broken down as follows: 60% import, 20% trade, 10% service, and 10% transport.

There are indications that the input and output figures ought to be substantially larger, in spite of the fact that the value added in the above data is already far in excess of that shown in the Okigbo[1] data. Nigeria's imports of cloth are worth about £ 25 million, before duty, and so even if we place a simple value-added proportion on this without taking cuts for duty, transport, trade, etc., we come out with an output to consumption of some £ 50 million. This is in the same range as the national estimate for clothing of £ 77 million. The difference arises because a large part of the cloth imported goes directly to private hands and is manufactured into clothes in private homes. Theoretically this should be included in the calculations, but in this account we were concerned only with the tailors that work on clothing for other people.

Singlets
(Underwear)

Inputs		Outputs	
Electricity	4.9	To Consumption	390.7
Transport	26.7		272.1
Trade	33.4	Value Added	118.6
Service	31.4		
Imports	166.5		
Miscellaneous	9.2		
	272.1		

This account is probably not very accurate. In the first place it was difficult to determine exactly how many singlet makers were in operation during the study year. The industry was, and still is, going through a period of transition from many small firms to a few medium sized firms. There are probably about 9 firms in the business at present, and it was estimated that there were 22 during the study year. This estimate came in part from the three industry counts described in Chapter III and in part from the author's own knowledge of the industry. For 15 of the 22 estimated, accounts in some form or other were available, some of these were fairly complete, others listed just output per month

* See Chapter V.

[1] Okigbo, Op. Cit., p. 91.

and cost of input, still others listed only number of employees. Breaking the accounts down into the four small industry sizes, average costs for each size were obtained and these projected to the whole industry. The sum totals appeared primarily as imports, local goods, and administration, and from this vantage point the standard breakdowns were applied. This calculation routine points out the great difficulty of getting information about the smaller industries and assembling accurate accounts. In this case, however, the order of magnitude is accurate, and the size of the industry in relation to the whole economy means that the final errors are relatively small.

Footwear

Inputs		Outputs	
Rubber - from Agricultural Manufacturing	9.4	Output to Consumption	153.4
Imports	87.3		115.3
Electricity	3.8	Value Added	38.1
Water	.1		
Service	10.4		
Trade	.1		
Transport	.9		
Miscellaneous	.3		
Construction	.5		
Metallic Manufacturing	2.1		
Transport Equipment	.4		
	115.3		

This account is for two companies making rubber and canvas shoes from Nigerian rubber, and comes directly from their accounts with the usual adjustments to fit our study. The transport share might seem rather low in this instance, but it was recorded separately in the accounts and we preferred to use this figure rather than to make the normal estimate.

Shoes - Rubber

Inputs		Outputs	
From Transport	539.9	To Consumption	1,305.0
From Trade	81.8		818.1
Service	24.5	Value Added	486.9
Imports	171.9		
	818.1		

This account involved a slight conceptual difficulty. Here the process of the industry is to take old tyres and cut them up to make sandals. The question was where can the tyres be considered as coming from? The actual supplier is trade, which presumably gets them from transport. Possibly it could be said to come from transport equipment or possibly from the ultimate producer in non-

metallic (leather, rubber, paper, etc.) manufacturing. However, the tyres are different than those produced by the retreaders, and as they are actually the same article that appears as an input to retreading, we shall assign them to transport as we have with the retread industry. Trade, service, etc., inputs are calculated in the standard manner.

Shoes and Shoe Repair - Leather - Small

Inputs		Outputs	
From Tanning	232.0	To Consumption	1,260.3
Service	70.7		776.5
Trade	70.7	Value Added	483.8
Transport	70.7		
Imports	332.4		
	776.5		

Our first approach was to extend the number of firms from the Eastern Region count, and then to extend the cost structure of those firms to a nation-wide industry account. However, the imputed cost structure seemed too large, the inputs being over five times the total known leather supply in the country (imports and local production). Assuming that leather must be at least 40% of the input to the industry and that the industry took no more than 50% of the country's supply of leather, meant that the over-all industry accounts would have to be smaller than those calculated by the projection technique. Thus we turned to the assumed leather input and worked from this figure, already having cost ratios from the various industry surveys. In effect all but the leather was of import origin and a simple 10% each for transport, trade, and service was placed on the leather and the imports.

Sector 6. Drink and Tobacco

Beer and Soft Drinks

Inputs		Outputs	
Transport	136.9	Exports	8.5
Construction	8.3	Sales to Consumption	3,268.6
Transport Equipment	8.2	Excise Tax	(770.0)
Metallic Manufacturing	34.3	Recorded Sales	4,047.1
Utilities	50.0		1,532.8
Chemicals (Carbon Dioxide)	29.1	Value Added	2,514.3
Service	281.3		
Coal	.6		
Trade	44.7		
Miscellaneous Manufacturing	77.0		
Imports	62.4		
	1,532.8		

These accounts are based on actual data from about 1/3 of the industry. In

the case of beer we have exact figures (except for the native brew) as this is subject to excise, and at the time of the study was only brewed in two locations. Soft drinks presented a difficult case in our study period as this was a time of transition, a time when the industry was going from a large number of small firms to a small number of large ones. From 1959 to 1961 the failure rate in small soft drink establishments was quite high and thus, lacking complete records of the industry, we were faced, even at the start with a question of exactly how many firms were in existence during 1959/60. Our approach on this was to consult the various records and listings of industrial establishments, and at the same time refer to the industrial enumerations done by the Department of Statistics and by AID (in the Eastern Region). Our final guess as to firm population was about 35 small companies, 3 Nigerian Breweries, and 4 other large firms.

Complete records for the Nigerian Breweries were at hand, and although the time period involved was three months earlier than the study year, the assumption of reasonably steady production was made.

The four other large firms were more of a problem. Only for three of them was data other than production available, but since total production was at hand, the ratio of total production to three-company-production was applied to all items of cost to get a four company total. Of the three firms, with data in full, the time period was somewhat earlier than the study year. For two of them production figures for 1961 were available and from these it was deduced that there was a rise of about 12% between the data and the study year. Consequently all figures were adjusted upward. For the third, it was noted that one of their most popular drinks had been introduced during the data period, but was in full production throughout the study year. Thus the data was adjusted to indicate a full year's production of this drink, resulting in about 50% addition on all figures.

For the 35-odd small firms it was found that records existed for eight, scattered over many varied time periods. Here it was assumed that these were typical of any time period, including the study year. The totals for the eight were divided to obtain a per firm cost, and these costs were multiplied by 35 to get a small industry total. The total error inherent in these figures may be sizeable, but it should be noted that their effect on the industry is small, as the total small firm output is barely 2% of the total output.

The standard categories such as administration were broken down according to the normal pattern, imports for the big firms and imports for the small firms were divided according to their individual breakdowns.

Finally, it should be noted that industry production figures are lower than the total amount actually recorded as sales. The difference is in (£ 770.0) worth of excise tax paid by the beer companies, in effect value added between the producer and the consumer by the government.

Tobacco Manufacturing

Inputs		Outputs	
Service	60.3	To Export	81.0
Transport	45.8	To Consumption	9,470.6
Trade	15.4		9,551.6
Imports	2,918.3		3,362.2
Miscellaneous	17.1	Value Added	6,189.4
Agriculture	282.6		
Utilities	21.6	(Excise Tax Paid by Consumer)	4,159.3
Transport Equipment	1.1		
	3,362.2		

This account includes the three cigarette manufacturing companies, and several small cigar makers.

Figures for the cigar makers come from personal observations and from small industry surveys. Figures for the large cigarette manufacturers are from returns covering two years that overlap the study year. As cigarette consumption and sales seemed not to be rapidly changing during the time period under consideration, the accounts for the two years were averaged to obtain our figures.

A problem was encountered in separating the use of imported tobacco from that of local tobacco, as this was not itemized in our data. The companies publicly claim a large use of local tobacco and they do buy a lot of it. But actual use in cigarettes seems to be somewhat lower. This is a conjecture on our part, based on the costs of the tobacco inputs. Our approach was to take the per pound costs of each type of tobacco (£ .066 for the local and £ 1.03 for the imported, including duty) and apply them to the known cigarette manufacturing inputs. A pair of simultaneous equations gave our breakdown of tobacco inputs.

In the statistical listing of Nigerian exports there appears an item under "tobacco and tobacco manufacturing." The bulk of this trade, which has since disappeared, was with Ghana. We assumed that it referred to the export of Nigerian cigarettes rather than leaf as, first, Nigerian leaf is not of particularly high quality; secondly, Ghana has a certain amount of her own leaf; and third, Ghana developed cigarette manufacturing of her own during and since our time period.

Sector 7. Food

Butter

Inputs		Outputs	
From Milk	5,238.4	Exports	25.4
From Service	1.6	(To Dried Milk)	3.4
Imports	8.0	To Consumption	5,378.8
Transport	1.3		5,407.6
Trade	1.1		5,250.8
Wood	.1		156.8
Coal	.3		
	126.3	Transport Export	1.0

The butter account is an aggregation on the Vom dairy with the ordinary village manufacture of ghee. As the inputs from the milk account were valued at the price that the Vom dairy pays for cream, the subsequent value added in local butter is rather low and the resultant cost per gallon of local milk is also low. This is because the output figures for both butter and milk were derived from the global figures presented in Okigbo. In the case of butter the output was assumed (in pounds) to be 7/11 of the volume of milk in gallons. Valuation of butter was kept the same as in 1957. The individual inputs listed under butter are those of the Vom dairy.

Meat Processing and Dried Milk*

Inputs		Outputs	
Imports	34.3	To Consumption	100.7
(From Butter)	(3.4)	Export	35.0
Milk	.2		135.7
Groundnut Processing	.1		126.3
Trade	1.5	Value Added	9.4
Transport	6.2		
Miscellaneous	2.9		
Service	10.4	Export Costs (Tinned Meat)	
Coal	.8		
Electricity	.2	Transport Export	4.4
Construction	.1	Service Export	4.4
Metallic Manufacturing	.3		
Transport Equipment	1.7		
From Meat	64.2		
	126.3		

Meat processing is the factory at Kano. Figures are from actual accounts and assume 4 million tins of food produced. The food inputs were broken down into rice (imported) and beef, using two simultaneous equations derived from the prices of rice and meat and also the assumption that the 4 million tins were each 5 1/2 oz. Other entries are the result of standard treatment of Administration and imports.

* Consolidated account to avoid revelation of confidential information about an individual firm.

Dried milk is the UNICEF project at Vom. Figures were taken from actual data, the only adjustments being the usual allocations of transport, etc.

Miscellaneous Foods

Inputs		Outputs	
Transport	32.8	Exports	68.8
Trade	2.2	To Consumption	462.1
Service	36.7		530.9
Imports	256.8		441.2
Wood	1.2	Value Added	89.7
Agriculture	108.0		
Electricity	3.5	Export Costs	
	441.2	Transport Exports	7.7

This account is a collection of accounts for a number of miscellaneous foods and related products, and ranges from extreme accuracy to rather diffuse global estimates. Included are powdered yams, baby foods, fruit juice, dried bananas, candy, etc. In most cases only input and output figures were available and thus estimates had to be made as to the origin of the inputs. The rather high import figure came from the estimate that virtually all of the input to the sweet manufacturing industry is imported. This is one industry that needs to be studied more closely as very little information is currently available.

Margerine, Tea Blending and Canned Fruit*

Inputs		Outputs	
From Agricultural Processing	44.6	Exports	10.5
From Agriculture	7.7	Sales to Consumption	142.7
Imports	90.8	(Sales to Bread)	(87.2)
Service	18.4		240.4
Utilities	7.1		186.3
Transport	3.4	Value Added	54.1
Miscellaneous	6.6		
Trade	3.4		
Transport Equipment (Repair)	1.7		
Metallic Manufacturing (Repair)	1.7		
Construction (Repair)	.9		
	186.3		

Margerine: This is the only firm in Nigeria making margerine and cooking fats on a commercial basis. It utilizes palm oil and various other locally available fats of the palm family and has a capacity to replace completely the Nigerian imports of cooking and eating fats. However, it is doubtful that is is doing so at present.

* Consolidated to avoid revelation of confidential information about an individual firm.

Preparing the return presented a problem as, although returns were available, the firm is a subsidiary of another local company. Up until about 1960 it was a sister firm of one of the local soap makers, but after that, at least for accounting purposes, the two were consolidated; and even before this date there was some partial consolidation, so that although we had a return for the study year, it was valid only for production, as costs were merely listed as "contracts" and lumped all together as one item. Thus we had to take the 1958 return, and armed with production figures for 1959 and 1961, calculate the production, assuming a linear growth, for the study year 1959/60. Then applying the ratio of this figure to the 1958 figure, we came up with a ratio, which was then applied to the cost data for 1958. Thus the figures above; here administration was given the standard breakdown and imports had a 10% service charge deducted from them. The transport component of imports was not deducted in this case as the plant is located right on the water's edge in the Lagos harbor.

The problems of this account would have been far simpler if we could have said that margerine and soap were in the same industry, then the consolidation would have taken care of cost distributions. Unfortunately, since one product is edible and the other is not, this could not be done.

Finally, we included an export figure in the outputs. This is to balance a figure on the Nigerian export lists that is labelled "processed oils and fats," and it seemed likely that margerine would fit into this category; however, we had no definite information as to the exact nature of this export.

Tea Blending: Here we were faced by an apparent paradox; the company's stated output is only a little more than 1/2 of the material input; at the same time inventories dropped. In addition, we had a statement that the company only started production halfway through the study year, yet there is a large investment apparently carried over from a previous year as well as a substantial inventory.

The factory imports bulk tea of several grades and blends and packages it locally. The operation enjoys a pioneer status and this may account for the apparent loss on the accounts.

It is rather hard to incorporate such an operation into an input-output analysis in that it represents a transition state and the account is not even for a full year. To have real meaning in the table we had adjusted the input figures, we made an approximation by doubling the amount of sales and leaving the costs the same.

Canned Fruit: This account is for the cannery at Ibadan, and is the only such enterprise in the country. Using local fruit, of which only the grapefruit is purchased from the Marketing Board, it has been, since its beginning, a marginal operation. Started by the Government, it is now owned by the Development Corporation of the Western Region. Available information on this operation consisted of a full report from the year previous to the study period, and a production record for 1961; using these two, an estimate of the study year production was obtained and the ratio of this to the recorded year production was applied to all items of cost and output.

Pork and Pork Products

Inputs		Outputs	
Transport	158.8	Sales to Consumption	389.0
Pigs	259.5		523.1
Coal	.5		- 134.1
Utilities	20.3		
Construction	4.9		
Metallic Manufacturing	4.9		
Transportation Equipment	6.1		
From Service	18.3		
Imports	39.6		
Miscellaneous	6.8		
Trade	3.4		
	523.1		

Figures are based on accounts of one of the two manufacturers. We assumed an over-all pig input of 25,000[1] and the ratio of this to the recorded input on the one firm for which we have data gave a ratio to be applied to all items of input and output to get an industry figure. The transport figure, at least as far as the pigs were concerned, was from the railway tariff - we knew that about 90% of the pigs came from Kano and Minna, the other 10% was assumed to have a £ 5 transport charge. Items of cost in the above accounts were derived from the standard treatment of items of repair, import, and administration, as well as direct figures. Coal was treated in the normal manner, using £ 2.5 per ton as the pithead cost.

Bakeries

Inputs		Outputs	
Firewood	25.8	To Consumption	6,674.3
Utilities	11.1		4,579.2
Construction	11.9	Value Added	2,095.1
Vehicle Repair	10.2		
Metallic Manufacturing	7.6		
(Margerine)	(87.2)		
Groundnut Oil	56.2		
Trade	166.8		
Transport	353.3		
Service	518.6		
Miscellaneous	245.1		
Imports	3,047.8		
Printing (Labels and Wrappers)	37.6		
	4,579.2		

This account is far more accurate than most of the others in this study, in

[1]Okigbo, Op. Cit., pp. 73-74.

spite of the fact that there are a large number of small firms in the industry. We were very fortunate to have a detailed cost structure of the Nigerian bakery industry available for use in this analysis; this was the result of an intensive study undertaken by a private researcher during 1961. If we had simply projected a number of firms from the Eastern Region small industry survey, we would have come up with a rather large number of establishments. Happily, we knew the minimum and average output of bread per man, and even if we had assumed each establishment to have only one man (most actually have two), the amount of bread produced would far exceed the amount that could be made from the recorded imports of flour, Nigerian bread being made entirely (at the time of the study) from imported flour. Thus we started with the import figure, and making the one assumption that 95% of the imports went into the bakeries, we could then project the whole cost structure of the industry.

Food - Small

Inputs		Outputs	
Firewood	633.2	To Consumption	9,045.8
Agriculture	2,026.3		4,523.0
Livestock (Meat)	506.6	Value Added	4,522.8
Trade	452.3		
Transport	452.3		
Service	452.3		
	4,523.0		

This account covers the omnipresent small maker and seller of food. This food ranges from "palm oil chop," to cooked meat, to gari, and fried staches. This is food that is bought for consumption away from the household and is typically the worker's lunch. It is assumed here that the person who sells the food also prepares it, i.e. we do not include a trade mark-up.

The account was calculated as follows. First, the urban consumer studies gave a percent of household expenditures on such items, as well as an absolute amount. From these a weighted average for the whole Federation was constructed and converted (with family size data) into a per capita per year expense. Then we had to assume that this type of food consumption took place only in the towns. Then, the next step was to estimate an urban population for the Federation, and then multiply this times the per capita expense to get the consumption figure. Two more refinements were added, the first being the food price increase since the dates of the surveys, and the second being the population increase since the 1952/53 census.

Taken from the inputs there are as usual the distribution mark-ups to trade, service and transport. It was assumed for this industry that expenses on such as pots, utensils, and gari pounders, were investment rather than current expense.

Sector 8. Metallic Mining

Mining, Lead, Zinc, Tin, and Gold*

Inputs		Outputs	
Imports	397.8	Exports	6,053.3
Timber	8.7	To Metallic Manufacturing	12.0
Transport	51.6		6,065.3
Service	126.7		1,018.8
Electricity	236.2	Value Added	5,046.5
Coal	19.4		
Wood	27.0		
Transport Equipment	19.3	Export Costs	
Metallic Manufacturing	19.3		
Construction	19.2	Transport Exports	182.9
Miscellaneous Manufacturing	31.2		
Trade	62.4		
	1,018.8		

Mining: This is the account for the one hundred-odd firms mining tin on the Plateau, as well as other scattered metal mines, such as gold, zircon, etc. The figures are reasonably accurate as they came from mining department returns; this department is reasonably efficient and the revelation of information to this agency by the mining companies is an established practice, required by law.

Transport on exports came from actual returns, as did part of the imports, the pit props, and the transport on directly imported items between the ports and the Plateau. In the few cases where the returns lumped together expenses from several different categories, distribution was made according to percent of over-all expense in other accounts where the listings were separate.

Part of the salaries paid to mine workers was paid in food and fuel. As this was not strictly an input to production, the amount was subtracted from the account of local supplies. Repairs were broken down, giving 1/3 of the total to each of the three types. The same was done with the amount for "other fuel" assumed to be coal, gas, and wood, but the wood was diminished by the amount supposed to have been given out as wages.

Finally, there was a large amount listed under the categories of locally obtained replacement parts and tools, and other locally obtained supplies. These it was felt had some local origin, but were primarily of import origin. The breakdown was as follows: 50% import, 10% each to transport, service, and miscellaneous manufacturing, and 20% to trade. The item listed as output to metal manufacturing is for gold, all of which it was assumed went to local goldsmiths.

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* Consolidated account to avoid revelation of confidential information about an individual firm.

Lead / Zinc: This came from actual accounts of the only producer in Nigeria. The firm is no longer producing as revenues per ton are below cost per ton and the seam is not particularly extensive. Nigeria uses very little lead itself (one estimate described this use as equivalent to a cube of lead eleven feet on each side per year)[1] and the world market is not particularly bright. The sales of the mine during the study year represent a small sale from an accumulated inventory. Zinc production was nil during the study year.

Sector 9. Other Mining

Oil

Inputs		Outputs	
Imports	2,766	Exports	3,346.1
Transport	186		3,440.0
Utilities	74	Value Added	- 93.9
Transport Equipment	16		
Construction	91		
Metallic Manufacturing	9		
Non-metallic Mineral	50		
Trade	113		
Forestry	52		
Service	31		
Miscellaneous	52		
	3,440		

Accounts were taken from data of calendar years 1959 and 1960. In order to fit them to the time period of this study, and this was necessary because of the rapid change taking place in that industry at that time, certain adjustments had to be made. First, the export trade figures for Nigeria were consulted and it was discovered that 42% of the increase between 1959 and 1960 came in the first three months of 1960. Thus the oil company figures were derived by taking 42% of the difference between the '59 and the '60 accounts for each item and adding this to the 1959 figures.

There were a number of assumptions on some of the figures, particularly with respect to the transportation component. It was assumed that 5% of the import figure, 10% of the local supply figure and 5% of the administration figure were transport. Trade charges were 20% of other supplies and 10% of administration. Forty percent of administration was assumed to have come from services and 45% from imports, whereas 50% of other supplies came from imports and 10% came from local miscellaneous manufacturing.

It will be noted that the above figures are to the nearest thousand pounds rather than being carried to the hundred pound place as in the other accounts in this study. This is because our original data for the oil industry was already rounded off to the thousand pound level.

[1] Study of the Lead Industry in Nigeria - Armour Research Foundation for the Rockefeller Brothers Fund, Lagos, 1960.

Sand, Stone, and Gravel

Inputs		Outputs	
Imports	106.4	To Tiles and Concrete Blocks	40.4
Transport	15.2	Exports	35.3
Trade	15.2	To Mineral Manufacturing	17.1
Service	15.2	To Construction	4,568.0
	152.0	To Cement and Ceramics	86.2
			4,747.0
			152.0
Transport Exports	26.3	Value Added	4,595.0

This is a very diffuse account. Thus the above figures represent approximate known inputs and outputs rather than being a comprehensive account.

As might be suspected, we arrived at a very high proportion of value-added in this account. This is due to the fact that most of the industry is hand operated. Occasionally there are machines such as graders and crushers, but more commonly these are operated by the users of the material. Sand, a huge part of the industry, is simply shovelled from river bottoms by hand and set out to dry. Perhaps it may be washed and screen graded, but certainly nothing more than this. The gravel industry consists of screening gravel that is dug in open pits and loading it onto lorries to go to the user. Sometimes this may also be washed. Stone is usually blasted from a hillside and in one case mechanically crushed and graded. In the other cases it is reduced by hand to the necessary sizes and then screen graded. Although the industry is scattered throughout the Federation, particular centers of activity seem to be Abeokuta for stone and gravel, and creeks near Lagos for sand.

Coal

Inputs		Outputs	
From Service	12.2	To Electricity	430.0
Transport	30.4	Export	131.1
Imports	241.8	Government Consumption	15.4
Timber-pit props	3.0	Various Users and Consumption	233.2
	287.4	Transport	813.9
			1,630.7
			287.4
		Value Added	1,343.3

This account was prepared without the annual report of the Coal Corporation. Although sales were obtained from published statistical reports, inputs had to be imputed from ratios derived from data given for previous years in Okigbo. From reports of the Forestry Division of the Ministry of Agriculture it was concluded that about £ 6,000 was spent on pit props, the rest of the materials were assumed to be imports. From the imports a standard 10% to transport was deducted. It was relatively simple to get the revenues, by using the 50 shilling pithead

price per ton, and adding a 6 shilling margin for the direct sales from the mine. Most of the production of the Coal Corporation is taken by the railways and sold by the latter organization. Although the 50 shilling price matches very closely the average price of previous years, there is some difficulty in making the accounts balance beyond that point. The export value is far in excess of the pithead price plus the stated revenue of the railway corporation in hauling the coal to Port Harcourt for export. Similarly, the imputed transport costs (using the railway tariff) for the coal sold to the Electricity Corporation (it is assumed that Enugu and Oji River are direct sales) - Lagos, Ibadan, Port Harcourt, and Kano - are about 50% higher than the total revenue declared by the NRC for all internal hauling of coal and yet the ECN usage is only about 65% of the Coal Corporation's output.

* * * * * *

Mining - General Note: Okigbo[1] has a value-added of 9.4 million in 1957 for the industry. Our study indicates value-added as follows:

Tin, etc.	5,046.5
Coal	1,343.3
Oil	- 93.9
	6,295.9

The difference can be accounted for as follows:

1. Production figures for the industry are down from 1957; that is as far as total value produced is concerned.

	1957	1959/1960
Tin	£ 7,629	£ 4,215
Colombite	761	1,125
Others	188	133
Coal	2,020	1,340
	10,598	6,813

2. Although oil production increased, there was no real value-added as expenses still exceeded revenue. Okigbo[2] treated exploration expenses as being outside the economy, whereas we have done so only for those expenses that were placed in the capital account.

Sector 10. Chemicals

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[1] Okigbo, Op. Cit., p. 20.

[2] Ibid, p. 77.

Carbon Dioxide and Dry Ice

Inputs		Outputs	
From Coal	.6	To Soft Drinks	29.1
Transport Equipment	1.6	To Transport	4.3
Electricity	2.4		33.4
Imports	3.4		10.2
Service	1.1	Value Added	23.2
Transport	1.1		
	10.2		

This account comes from actual reports of the two companies involved. The time period was somewhat earlier than the study year; however, production figures were available for the year 1961. Assuming a linear growth, a production for the study year was estimated and the increased percentage was applied to all elements of cost.

It is assumed that the entire output of CO_2 went to the soft drink industry, and that the dry ice production went to transport for use in the refrigerated transport of food.

Industrial Gases

Production of oxygen and acetylene.

Inputs		Outputs	
Service	1.4	To Metallic Manufacturing	17.7
Imports	10.0		12.2
Metallic Manufacturing (Repair)	.8	Value Added	5.5
	12.2		

This is an account for the production of oxygen and acetylene used in metal working for welding. The accounts are based on the known data of output of the industry, plus a certain amount of informed guesswork. It was assumed that oxygen is obtained by fractional distillation of air and that acetylene is obtained from carbide. The gases are apparently made by a company also engaged in making steel containers and, as the accounts are not specific, it is a bit hard to separate the industries, particularly when it can be assumed that some of the gas output is used internally by the company.

Bitumen

Inputs		Outputs	
Imports	501.2	To Construction	740.1
Metallic Manufacturing	154.3		655.5
	655.5	Value Added	84.6

This is the account of a firm bulking bitumen and pitch. As actual accounts

were not available, the calculations were made from known imports of bitumen, sales of metal drums to the industry, and an approximation of the bitumen inputs to road construction. In addition a certain amount of this bitumen is taken directly to construction sites in road tankers; this activity was considered to be in the service sector. The essence of the bulking industry is that of taking imported pitches, etc., and blending them into grades usable for making roads. The savings are introduced by not having to transport the material in individual drums on ships; rather it is imported molten on tankers. Thus the output figure is the same as that which would have been paid by construction had the bitumen been imported in drums. Included in the import figure is an amount for the fuel which is estimated to have been consumed in heating the bitumen and pumping it.

Soap - Large

Inputs		Outputs	
Utilities	34.9	Export	151.5
Construction	13.2	Consumption	2,278.1
Metallic Manufacturing	3.9		2,429.6
Transport Equipment	4.8		1,235.5
Coal	24.3	Value Added	1,194.1
Carpentry	6.8		
Service	207.9	Export Costs	
Transport	65.8		
Import	293.1	Service Exports	14.4
Trade	30.4		
Agricultural Processing	489.6		
Miscellaneous	60.8		
	1,235.5		

Standard breakdowns were made on items of import and administration. Local supplies could be identified as wooden cases for soap and were applied to carpentry in Sector 19. In the case of coal it was relatively easy to extract transport charges assuming the £ 2.5 per ton pithead cost.

It might be accurate to state that the accounts of this industry are the most confused of those encountered in our study. The figures above are for only five firms, all expatriate controlled, that dominate the industry and produce an estimated 50% of the soap in the country. The soap industry is well established in Nigeria and produces possibly 99% of the soap used in the country, including locally made bars of an internationally known soap (the factory making them is about the oldest real industrial undertaking in the country). In spite of this there is a tremendous amount of competition in the industry, both among the five big firms and between them and the small soap makers. The confused and inaccurate figures submitted to the Government might be explained by assuming that none of the companies wished to reveal much about their costs and procedures. Another factor that contributed to the confusion was that at about this time the government was looking for a method of placing an excise tax on the industry. *

* This was subsequently tried and proved to have many problems particularly in taxing the small firms. The first move was a direct excise per bar of soap,

(cont. on page 94)

Because of the sloppy accounts there were many problems to be dealt with in preparing them for the analysis. In the first place, it proved to be impossible to follow the physical units involved, a practice normally followed for other industries. Thus, reliance was placed on money values, and only where the physical units imputed seriously differed with external information was a change made. This was the case with the figures for glycerine. The industry recorded a higher output and value than the export figures for the same time period. This might indicate a local consumption of about 20% with a price about 25% higher than export. Since both of these are rather improbable, it was assumed that the industry export figure was identical to the export figure less a 10% charge to the service sector for clearing, etc. Another difficulty was that the time periods of the reports did not coincide with each other and there were so few multiple reports so that a standard time period was not constructible. Thus the reports were taken with their own time periods and the assumption, of little or no change because of industry maturity, was made. In addition items recorded for different companies were not the same even under the same categories. Thus a bit of interpretation had to be done to get some kind of a unified account.

Another incomprehensible item was the use of caustic soda. The average price to the soap companies appeared to be about 75% above the import plus duty price, and since the quantity used was rather large it did not appear that the difference could be accounted for by service and transport charges. In this case the money value of the caustic was used and the conflict with physical units disregarded. The reason for this is that is seemed likely that the companies were understating their usage of caustic as this is a direct indication of production and thus of excise due the government. Thus an estimate of production from the stated usage of caustic would be about 17.5 thousand tons, and the actual tonnage produced is probably about 40,000 tons. Estimates using the value of the caustic rather than the quantity indicated production near the actual tonnage.

Finally, difficulty was encountered with the palm kernel inputs. The oil of these kernels is used in making certain kinds of higher grade soaps. The stated price in the accounts was twice the sale price of the Marketing Board, and so it was assumed that the entry "palm kernels" meant the oil rather than the nut and that the quantity was of the oil. Calculations indicated, however, that the value placed on it was that of the original nuts, and so this figure was used.

(* cont. from page 93) but the smaller firms got around this because of the difficulty of policing scattered small production units. The system presently in use is a heavy - about 85% - tax on caustic soda which is an essential component of soap making. The larger firms claim even this does not work because the smaller manufacturers can also use locally manufactured potash - although the soap in this case is of a rather poor quality.

Soap - Small

Inputs		Outputs	
Imports	10.0	To Consumption	151.6
Trade	1.4		126.0
Transport	1.4	Value Added	25.6
Service	1.4		
Palm Oil	111.8		
	126.0		

This account is based on the accounts of three small firms and the estimate that 20,000 tons of soap are produced by small operations. Also, from the accounts of the large companies we find the ratio of cost of oil per unit of production to cost of caustic for the same unit is about 88 to 12 and thus this ratio was applied to the inputs to small soap makers. The caustic figure was then considered to be imports, and the standard small firm import cost distribution was applied.

Lime Manufacture

Inputs		Outputs	
From Fishing	.2	To Consumption	3.9
Imports	.1		.9
Wood	.4	Value Added	3.0
Electricity	.1		
Transport Equipment (Repair)	.1		
	.9		

This is a small operation manufacturing lime primarily from seashells - thus the fishing input. Figures came from an actual account for the exact study year. It was assumed, for lack of a better destination, that the output went to consumption. More likely it went to construction and/or agriculture, but as we could not be sure, and as the amount was very small, we left it with consumption.

Vaccine Production

Inputs		Outputs	
Transport	13.4	Sales to Livestock	35.3
Utilities	5.5		60.0
Livestock	7.6	Value Added	24.7
Agriculture	7.6		
Metallic Manufacturing (Maintenance and Repair)	7.3		
Transportation Equipment (Maintenance and Repair)	3.3		
Service	2.7		
Construction (Maintenance)	3.7		
Imports	8.9		
	60.8		

Although this is an industry, it is conducted by a government department

as part of a research unit, therefore it would not be expected to show profits. Theoretically it would be possible to separate the vaccine production costs from the research costs, but in view of the nature of the information - which comes directly from Federal Government expense statements, the separation would take far more calculation than the size of the results would justify in this study. Thus we included the whole research station account.

Sector 11. Transport

Transport

Inputs		Outputs	
Intermediate Inputs	1,348.7	Personal Consumption	20,100.0
Imports	11,867.8	Government Consumption	6,429.6
Repairs	6,158.8	Intermediate uses (Except Service and Trade)	18,804.9
Miscellaneous	436.6	Contribution to Exports	11,211.3
Trade	1,647.2	Portion of Markup on Subsistence Food	30,000.0
Service	2,958.7	Markup on Imports for Personal Consumption	15,332.5
	24,417.8	To Trade	1,699.7
	104,919.4	To Service	1,341.4
Value Added	80,501.6		104,919.4

This account was a rather difficult one to calculate, particularly when its portion of the G.N.P. is taken into account. It was based on various scattered estimates, none of which was particularly certain. Although a lot of work has been done on this subject, particularly in relation to the road transport situation, no one has really come up with a definitive picture. Not only are the inputs diffuse, particularly when the constant lack of maintenance is considered, but the outputs are generally involved with distribution and trade, which are even more uncertain as far as good data is concerned.

Our starting point was the data in Okigbo and the E.P.U. projections upon it. These projections state that the value-added in our study year was some 90.1 million pounds. From that point we took the equations in Okigbo,[1] and using the lorry registration figure for 1 January 1960,[2] we came out, after projecting the lorry figure to include all transport, with some £ 138 million sales for the industry. This, however, left us with £ 48 million of inputs to account for. We considered then all the imported inputs with their duties and markups and all the identifiable local inputs - including repair, and we came up with an input gap of £ 22 million; clearly, something was amiss with this method.

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[1] Okigbo, Op. Cit., pp. 88-89.

[2] Quarterly Digest of Statistics, Vol. 10, no. 4., p. 65.

Our next approach was the Stanford Report on Transport. This report, although excellent did not present quite what we needed. Its purpose is to show that road transport is not paying its fair share of costs, and it does this by first comparing the duties and tolls paid with the costs of maintaining the right of way. Nevertheless, it contains some very useful figures, particularly the estimate of 670 million vehicle miles travelled during our study year, and also the figure of 85.8 million pounds of revenue from road transport. To this revenue figure we added the commercial river revenue, the airways revenue, and the railway revenue, all contained in the Report. Finally, we calculated the revenue from the inland waterways from the Federal budget record of actual receipts. This gave a total of 103 million pounds of revenue, but it lacked one form of transport, that conducted on the water in small canoes. This, all authors agree, is a significant business, but no one has ever published any figures concerning it.[1] As it is of reasonable size, especially in the Delta area, we could not neglect it. Thus we were forced back to pure guesswork and thus we have included the amount of £1,000.0 to cover the receipts of this form of transport.

Having decided on the total transport product, we then had to decide where it was going to. Personal consumption was calculated from the E.P.U. extension of Okigbo, first deducting the expenditure of consumers on private transport, i.e. personal autos. Government expenditure was calculated by adding up all the items of transport and travelling in the budget returns of the four governments. This figure was then doubled to include transport expenditure on auto allowances, by local governments, and by the Marketing Boards (which we have included in the government sector). Exports and intermediate sector use of transport was obtained by summing our tables already prepared. We then took a 14% markup on consumer and government imports (this is the same as 10% on the retail price) plus duty, and also took 1/3 of the Okigbo estimate of markup on domestic food consumption. The final residue was arbitrarily divided between trade and service somewhat on the basis of the total business done by each of these sectors.

Expenses were calculated as follows. First, the already identified intermediate inputs, such as coal and tyres, were listed. The next step was to take the Okigbo formula for the commercial use of spares imports[2] and onto these imports place a 12 1/2% margin (after duty) for service and for trade. For petrol usage we had to go to a document that was used by the Stanford Report[3] which gave the estimated population of each type of vehicle at our study date, the mileage travelled, and the average m.p.g. Onto this petrol import we placed the same 12 1/2% markup. Finally, the Report gave us some indication of the costs of the Railway Corporation road operation and from this we were able to obtain estimates of industry wide administrative costs and general supply costs.

[1] There have actually been, as far as we can tell two estimates made in scattered areas. The first was made several decades ago and enumerated the canoe traffic past Yelwa on the Niger, the second was made by the E.P.U. from data supplied by counts of canoes by a commercial river transporter. Neither report was available for this study.

[2] Okigbo, Op. Cit., p. 88.

[3] Hogg, W. W. and Roelandts, C. M. - Nigerian Motor Vehicle Traffic, An Economic Forecast. N.I.S.E.R., Oxford, 1962. Entire book.

The projection of repair expenses from these figures[1] gave a rather high estimate--24 million pounds worth. Since our calculations from the repair industry point of view indicated only about £ 4.5 million and since the lack of maintenance on the part of the road transporters is well known, we made the arbitrary assumption that repairs were only 25% of what they should have been, thus a figure of £ 6 million, projected to the whole transport industry, giving a total of £ 7 million.

Sector 12. Utilities

Electricity

Inputs		Outputs	
Coal	430.0	To Various Users - see individual Accounts, Residual to Consumption	5,129.2
Service	92.9		2,262.3
Trade	104.7	Value Added	2,866.9
Transport	296.7		
Miscellaneous	25.4		
Imports	731.7		
Sawmilling	205.0		
Construction (Repair)	19.2		
Metallic Manufacturing (Repair)	356.7		
	2,262.3		

From actual accounts of E.C.N., N.E.L.C.O. and A.T. & P., thus reasonably accurate. However, the account does not include every small generator of private electricity, thus it slightly understates the outputs. The amount from sawmilling is a balancing figure of the amount of electricity used in the sawmill in Sapele where electricity is privately generated. The electricity accounts only gave the excess electricity that the electric company bought from the sawmill for resale, thus we had to add the internal use to get the whole amount generated - this is balanced in the sawmill account by the cost of the private electricity as an input. The coal amount above is a direct calculation from the Coal Corporation and Railway Corporation statements, as E.C.N. did not break down the individual inputs. All other figures above are results of treatment in the standard manner of inputs such as administration. However, with imports, as they are mostly petroleum, we have taken off only 10% for transport, and 10% for the petrol company (trade).

Water

Inputs		Outputs	
Imports	7.2		
Service	6.7	To Various Users	350.0
	13.9		13.9
		Value Added	336.1

This account is only a rough outline of the industry and is based on the

[1] Stanford Report, pp. 184-185.

Okigbo estimate of value-added in water supplying. This only includes municipal water supplies, and the imports shown are for the estimated amount of chlorine needed to purify the water. This account should also include a certain amount for the energy used to pump the water. However, we assumed that it came from the electrical industry and thus was a transfer within the sector.

Sector 13. Trade

Detailed flow accounts were not prepared for this sector. Total figures appear in Table II, Chapter IX. See also the discussion under "Residual Accounts" at the end of Chapter VII.

Sector 14. Construction

Construction

Inputs		Outputs	
Imports	20,673.0	Investment, Government Consumption	87,917.4
Electricity	121.0	Intermediate Repairs	2,582.6
Transport Equipment	217.7		90,500.0
Metallic Manufacturing	83.0		52,346.0
Trade	6,072.0	Value Added	38,154.0
Service	934.0		
Transport	7,181.0		
Bitumen	740.1	Total Sales	90,500.0
Plastics	51.9		
Metallic Manufacturing	152.0	New Construction	85,000.0
Non-metallic Mining	4,568.0		
Carpentry	1,900.0	Repairs	5,500.0
Sawmills and Sawyers	6,574.3		
Timber	1,701.8		
Cement	1,014.9		
Brick, Tile, Concrete Products	359.0		
	52,346.0		

Most of the figures presented above are valid only to the closest thousand pounds, reflecting the very rough estimates embodied in them. This account was extremely difficult to calculate and the results can be said to approximate reality only in order of magnitude.

Our starting point was the figures contained in Okigbo,[1] especially the over-all estimates of investment in buildings and his breakdown of construction costs. To this we added the E.P.U. projections of the Okigbo data, but we could only use their method and not their data, as the time periods were not the same. The first task was to determine the total over-all value of construction and civil engineering. We estimated 90.5 million pounds of value

[1] Okigbo, Op. Cit., pp. 20, 98, 118-125, 127-142, 185-188.

for the entire industry, of which civil engineering and non concrete building made up 13.5 million each. At this point it should have been possible to use Okigbo's percent of value-added to get our own value-added data, but after some searching we discovered that the two definitions of value-added differed, Okigbo considering such things as sand and gravel as originating inside the sector and thus being part of the value added. In our analysis these activities are in another sector and thus are inputs.

We next turned to his list of the approximate components of construction costs as compiled from P.W.D. data and a small industry questionnaire.[1] We first assumed that the percents applied to concrete buildings only and proceeded to make our own parallel estimates for the other two areas of the construction industry. The next step was to apply these ratios to the total value, obtain a series of input totals, and then to compare these to some of our known external constraints, such as total supply of cement and total imports of products not produced within the country. It was found that if the classifications of inputs were slightly enlarged, for example making the item "metal door and window frames" include all metal products (other than plumbing and roofing) used in construction, that there was a rather satisfying degree of agreement. This was made more so when allowance was made for trade and distribution margins. Thus a whole set of known inputs was prepared from the external point of view, the data coming from other accounts in this study and from the import lists. In the case of glass and bricks it was found that the external supply was far less than the construction usage estimates and with timber, sand, and gravel, the opposite was found; the supply was larger than estimated. Thus some of the ratios had to be somewhat modified. It was found that if we assumed a 30% distribution margin, except in exceptional cases, that accounts began to balance. The exceptions were the higher costs associated with timber hauling and sand and gravel hauling, these being 50% and 40% respectively, and machine and vehicle repairs.

Output of this sector is to investment and government except for scattered repair charges. The total estimated economy repair bill from construction is 5.5 million. About .5 million of this appears in our intermediate sector accounts.

Sector 15. Service

Domestic Service

To Consumption			5,500.0

Entertainment

From Miscellaneous Manufacturing	413.3	To Consumption	1,500.0 413.3 1,086.7

A figure not in Okigbo but suggested by the AID report.[2] This represents

[1] Okigbo, On. Cit., p. 186.

[2] Report of the Second AID Mission to Nigeria, by Arnold Rivkin, p. 52-53.

the amount spent on entertainment such as drumming and festive occasions, etc. The input is our own estimate from the musical instrument industry account.

Intra-Household Services

To Consumption	10,000.0

This is another value-added figure not in Okigbo.[1] The transaction represents the value of labour in household service, particularly in the drawing of water and the carrying of domestic goods.

Ownership of Buildings

From Construction (Repair)	1,700.0	To Consumption	12,000.0
			1,700.0
		Value Added	10,300.0

This account comes directly from Okigbo.

Scrap Collection

Service Exports	288.1
Transport Exports	144.0
Trade Exports	144.1

This account balances the sizable scrap exports.

Sector 16. Transport Equipment

Vehicle Assembly

Inputs		Outputs	
Utilities	6.0	To Investment	1,088.6
Construction	.2		966.9
Service	101.0	Value Added	121.7
Miscellaneous	2.1		
Imports	754.9		
Trade	5.7		
Transport	97.0		
	966.9		

The account for Vehicle Assembly. Involved here is the assembly of lorries from imported parts. All the items in the account have been treated in the standard manner.

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[1] Ibid, pp. 52-53.

Transport Equipment and Repair - Large

Inputs		Outputs	
Miscellaneous	5.5	To Transport and Other Users	2,268.4
Imports	114.4	To Consumption	800.0
Service	26.7		3,068.4
Trade	18.5		296.4
Construction (Repairs)	19.6	Value Added	2,772.0
Utilities	73.5		
Coal	9.3		
Transport	28.9		
	296.4		

This account covers all of the large (mainly expatriate) vehicle repair shops. It was calculated, on the assumption that there are slightly over 40 such shops in the Federation, from data for about 6 of these establishments. The rest of the industry was calculated on a simple ratio basis. Items in the account were treated in the standard fashion. The account is far from accurate because of the difficulty of obtaining information about such activities, but we feel that the above figures are within the correct order of magnitude.

Transport Equipment and Repair - Small

Inputs		Outputs	
Imports	1,584.8	Output to Transport and other	
Trade	211.3	Intermediate Users (Repair)	4,330.1
Service	211.3		2,394.0
Transport	105.6	Value Added	1,956.1
Electricity	23.7		
Imports	47.4		
Wood from Sawing	189.9		
	2,374.0		

This account, which includes bus bodies, auto bodies, lorries, and motor repair, is a collection of all the small firms in the business. The account is a direct projection of the Eastern Region count and cost survey, and the over-all input and output figure is probably reasonably accurate. However, the breakdown of costs is based on a very small sample and is rather more impression than fact. It was assumed that the most important inputs would be metals, wood, parts, paint, and welding supplies. From this an import figure was derived and 10% was taken for trade and service and 5% for transport.

Boats

Inputs		Outputs	
Timber	5.2	Investment	205.3
Imports	58.0		123.1
Sawmilling	19.4	Value Added	82.2
Electricity	4.0		
Service	16.3		
Construction (Repair)	.2		
Metallic Manufacturing	.6		
Trade	1.9		
Transport	13.8		
Miscellaneous	3.7		
	123.1		

This account, covering boat building, and to some extent boat repair, was a bit difficult to reconcile. Okigbo[1] gave figures which agreed only in part with the present calculations, and this was in spite of the fact that the above figures are derived from the actual accounts of the four governmental boatyards. As far as the East and West boatyards were concerned, the agreement with Okigbo was close. In the North, the figure obtained here was only 1/4 of that in the earlier study. In addition Okigbo had a very large figure for boatyards in Lagos, of which we had neither knowledge nor accounts. We could only assume that Okigbo was referring to one or more of the large expatriate boat repairing facilities in the Federal region. Thus we included his figure as a repair calculation. Using the additional value-added we projected all the accounts on hand to a large account, shown above, which made provision for the Lagos undertakings. From that point on the accounts were treated in the standard manner, using the various regular breakdowns on administration, imports, etc.

Sector 17. Non-metallic Minerals

Tiles and Concrete Products

Inputs		Outputs	
(Cement)	(132.7)	To Construction	359.0
Mineral Mining	40.4		222.3
Utilities	9.3	Value Added	136.7
Imports	29.4		
Transport	2.1		
Service	3.1		
Trade	2.6		
Metallic Manufacturing	1.2		
Construction	.9		
Transportation Equipment	.6		
	222.3		

This account covers all of the larger firms in the tile, prestressed concrete and

[1] Okigbo, Op. Cit., p. 78.

block industry, and was taken from the accounts of about 50% of them with projections made to cover the rest. It does not include the making of these products in the construction business, nor does it include the making of blocks on the small local village scale. The whole industry is extremely competitive and thus data is not readily available for income studies. It was doubtful that continued study would reveal the true state of affairs in the industry, so we had to be content with the above figures being part fact and part supposition.

Cement and Ceramics*

Inputs		Outputs	
Transport Equipment	1.5	(To Tiles and Concrete Products)	132.7
Utilities	125.2	To Construction	1,013.9
Coal	82.0	To Consumption	15.6
Wood	.4	Exports	17.4
Imports	92.2		1,179.6
Service	44.8		516.1
Trade	7.4	Value Added	663.5
Transport	57.0		
Mining	86.2		
Miscellaneous	14.1		
Metallic Manufacturing	5.0		
Construction	.3		
	516.1		

Cement: This is a straightforward calculation. During the study period there was only one cement plant, located in the Eastern Region, in operation, and the accounts from it exactly coincided with the study year. Inputs of coal were valued at the pithead price of ₤ 2.5 plus transport to equal the figure in the company's account; and imports such as gypsum and bags were valued at their import value, plus transport fees calculated from the Railway Tariff. The difference was assumed to be service industry charges. Administration was broken down in the standard manner. The only question in the accounts was the input of limestone which in actual practice is mined in the company's own mine near the plant site. Thus the costs of this stone do not enter explicitly into the accounts. However, we wanted to place this activity with the mining industry so other estimates had to be made. From the mining department statements an estimate of the tonnage was obtained and valuation of the limestone was put at ₤ .42 per ton, which is equivalent to the price in the U.S.

Ceramics: As might be expected, this industry does not turn a profit, in fact most of its centers of production are organized by local governments almost as training centers. Our account does not include the vast number of individual potters across the country, rather it treats only the formal establishments for ceramic production. Other than the government industries, there is only one firm producing ceramic ware, and its output accounts for a large portion of the

* Consolidated account to avoid revelation of confidential information about an individual firm.

above figure. The input from the mining industry represents the extraction from the ground of the various minerals needed to make the pottery. All other figures above are the result of standard treatment of standard items.

Drilling Mud

Inputs		Outputs	
Mining	17.1	To Oil	50.0
Imports	2.1		19.7
Trade	.1	Value Added	30.3
Transport	.3		
Service	.1		
	19.7		

This account is the result of pure guesswork on our part. The product bentonite is used as a drilling lubricant in oil exploration. We include it in our study as it is a local Nigerian product.

Sector 18. Metallic Manufacturing

Large Metallic Manufacturing

Inputs		Outputs	
Utilities	48.4	To Consumption / Investment	2,093.0
Coal	.5	To Construction	152.0
Construction	16.0	To Bitumen	154.3
Imports	993.4		2,399.3
Miscellaneous	17.1		1,389.8
Trade	11.4	Value Added	1,009.5
Service	166.9		
Transport	132.7		
Transport Equipment	3.4		
	1,389.8		

An account covering the various medium and large metal manufacturing companies, except those engaged in transport equipment. The majority of the output is of a long term asset nature and thus goes to investment rather than to the intermediate uses. There is also, however, a certain amount of furniture and ornamental ironwork, and this goes directly to consumption.

The accounts were calculated from about 1/2 of the estimated number of firms in the industry and projected on a ratio basis. All the items were treated in the standard manner.

Metallic Manufacturing - Small

Inputs		Outputs	
Imports	3,213.3	Exports	7.5
Service	430.0	To Other Uses (Repair)	5,674.4
Trade	430.0	To Furniture	25.3
Transport	215.0		7,241.7
Firewood	174.6		4,562.0
Coal	30.2	Value Added	2,679.7
Electricity	39.2		
Industrial Gases	17.7		
Metallic Mining (Gold)	12.0		
	4,562.0		

This account was calculated in roughly the same way as small transport equipment, except that a lot more information was available. It includes: blacksmiths, tinkers, tinsmiths, goldsmiths, nail makers, ironmongers, silversmiths, welders, and bicycle repairers. For these occupations a lot of information was at hand, and although the import figure seems a little high, we have confidence that the total size of the industry is correct. The figure for industrial gases for welding was taken from the output figure of the company manufacturing them, additional use was assumed to be import. The mining figure is an approximate value for the gold produced in the country and we assumed that all the product was used internally. The firewood and coal figures are an arbitrary breakdown of a reasonable fuel bill.

Bicycle Assembly

Inputs		Outputs	
Service	10.7	To Consumption	340.5
Transport	8.6		320.3
Imports	300.3	Value Added	20.2
Electricity	.4		
Transport Equipment	.3		
	320.3		

The data above is from actual accounts, the transport and service figures being the difference between the import (after duty) cost and the in-factory cost of the bicycles.

Sector 19. Manufactures of Wood, Plastic, Leather, Rubber, and Paper

Large Furniture

Inputs		Outputs	
From Sawmilling	239.6	Output to Consumption and Construction	708.5
Metallic Manufacturing (for Iron Work)	25.3		383.9
From Sawmilling	3.3	Value Added	324.6
Electricity	10.4		
Construction	.3		
Metallic Manufacturing	3.4		
Transport Equipment	.5		
Service	20.9		
Trade	1.7		
Transport	9.0		
Miscellaneous	3.5		
Imports	66.0		
	383.9		

This account is for eight establishments in the furniture industry that could be called large. All other furniture makers were classified under the small account. As the figures came from actual accounts, there was no real problem with the data other than the translation from categories of administration, etc., to their components and these were treated in the standard manner.

Small Furniture

Inputs		Outputs	
From Sawmilling and Hand Sawyers	4,748.4	Output to Consumption and Construction	11,965.6
From Electricity	52.0	To Soap	6.8
From Metallic Manufacturing - Machine Repair	55.6		11,972.4
Trade	143.2		6,288.1
Service	143.2	Value Added	5,684.3
Transport	143.2		
Imports	1,002.5		
	6,288.1		

The calculation of this account presented some problems. The first approach was to calculate the number of establishments using the small industry ratios; this gave about 45,000. However, when we calculated the required inputs, we ran into difficulty. Using the sample costs, of which there were a large enough number so as to reduce substantially the statistical error, we came up with a total for inputs of only about £ 750 thousand worth. Yet we knew that the sawmills and hand sawyers put out almost £ 5 million worth to furniture and carpentry. Subtracting the amount used by large firms, we had a figure that was six times as large as our estimated inputs. Thus we had to work with the inputs, using the input/output ratios calculated from our data.

Unfortunately the cost structure of small furniture and carpentry did not cover much more than inputs as a whole, outputs, and value added. Thus we had to borrow a breakdown of inputs from the large manufacturers - with, of course, some adjustments, especially in regard to electricity and repair.

Plastics and Foam Rubber*

Inputs		Outputs	
Utilities	5.8	To Consumption	108.8
Service	2.2	To Construction	56.9
Transport	1.2		165.7
Miscellaneous	.4		57.9
Trade	.2	Value Added	107.8
Imports	45.8		
Construction	.1		
Metallic Manufacturing	.2		
Agricultural Processing	2.0		
	57.9		

Plastics: The account covers the single plastics firm in Nigeria (other than hand tailors of plastic cloth) at the time of the study. It is reasonably straightforward as direct data from the statistics form was available and its time period was the same as that of our study.

Sales to the construction industry are for plastic tubing. It is assumed that the main use of the tubing was for cold water pipes for houses. It should be noted that the transport input is very small: the reason being that the only inputs (other than the administration) of a tangible nature are plastic materials which have a very high volume / weight ratio. Calculating the costs of road transport to Ibadan at 10 d per ton mile, and knowing the weights of the plastic inputs produced a transport cost for the materials of only £ 600.

Foam Rubber: This is the account of a mattress firm using foam rubber. Figures are from actual data, the only adjustment being the 10% transport and service figure from the imports and local supplies. Apparently the company uses local latex.

Tire Retreading

Inputs		Outputs	
Service	51.1	Output to Transport	530.5
Transport	25.2		293.0
Trade	2.6	Value Added	237.5
Imports	154.8		
Miscellaneous	5.2		
Electricity	8.5		
Construction	4.0		
Metallic Manufacturing	5.9		
Transport Equipment	4.0		
From Transport (Old Tires)	31.7		
	293.0		

* Consolidated to avoid revelation of confidential information about a single firm.

A rather difficult industry to calculate in spite of the fact that there were only six firms in it. One problem is that the industry at the time of the study was expanding very rapidly, and the second problem is that for half the firms no figures were available. We were forced therefore to settle for a rather impressionistic output figure and upon this base the projections of data from three firms to six. Other than this, our calculations followed standard procedures.

This is probably the best example in our study of a completely unreachable industry. As it is rapidly expanding, past data is no good, especially when it is known that new firms have sprung up since past studies. Secondly, its output is all consumed within Nigeria and by a large number of small independent users whose industry itself is in a state of flux. Thus we could not even look for evidence of import substitution. Its inputs are very normal items, and those that are specific, such as camelback, were too small to appear as separate items in import data. Even an attempt to get estimates through the imports of machinery failed as this is lumped together with raw rubber machinery, which again is an uncertain industry. There were too few firms in the industry to be able to project outputs from existing data. Thus the failure of half the industry to report even output left us at a loss to do more than make an impressionistic guess. In this we were probably not more than 25% too high or too low.

We assumed a small value for the tyres taken in from the transport industry to be retreaded. These are almost worthless, but from several accounts a value of 31.7 was estimated for the whole industry.

Printing, Publishing, Stationery

Inputs		Outputs	
Imports	873.7	To Service	768.4
Electricity	32.0	To Bread	37.6
Trade	61.7	To Consumption	2,534.8
Transport	126.9		3,340.8
Service	267.6		1,389.6
Miscellaneous	6.9	Value Added	1,951.2
Construction	8.6		
Metallic Manufacturing	5.1		
Transportation Equipment	2.7		
Water	2.4		
	1,389.6		

This account is really two accounts, that of the large firms, and that of the small ones. The large firms in this case were eight sets of data at hand, for firms with substantial output and inputs. It was from these that most of the detailed inputs arose. The rest of the accounts are for an extension of the Eastern Region enumeration together with input and output data for the small firms. In this case we estimated a total input and then applied a ratio of outputs to the electricity figure to get an electric input to the small firms.

The rest was considered as imported inputs, from which we took 10% each for trade, service, and transport. It may seem that such a set of calculations are rather inaccurate, but it is interesting to note the close correspondence of the import figure and the corresponding national import of paper for printing. This would indicate that even though we have indulged in some estimation, the results are reasonably close to reality.

On the question of output, we had a problem. The over-all figure was accurately known. Our question was output to what? We knew that baking takes a certain amount. We suspected also a fair amount of the output would go to service, and the rest to consumption. However, such users are mainly in the unknown areas of the economy and thus we had in this case to borrow from another country. We found that the average contribution to service from printing, looking at several countries, is about 23% of total output. We used this figure and let the residual go to consumption.

It is entirely possible that a certain amount of the output went to other members of the food processing industry, possibly as labels for beer, soft drinks, and canned products. However, this was not investigated at the time of our fieldwork, and most of the firms involved did not list labels separately, and thus there was no immediate way of checking this transaction. Certainly it would seem to be a logical one, worthy of additional investigation. If it exists, it should be on the order of 3% of the total output value of the drink industry, or about ₤ 98 thousand.

Miscellaneous Manufacturing - Small

Inputs		Outputs	
Wood (From Forestry)	211.3	To Consumption	3,456.9
Trade	208.9		2,467.8
Service	308.9	Value Added	989.1
Transport	315.7		
Imports	1,334.3		
Leather	188.7		
	2,467.8		

This is a collection of various small firms in the wood, plastic, paper, etc., industries and was projected from the Eastern Region study. The only figures with decent accuracy are the over-all input and output figures, the breakdown of inputs was, as in other small industry calculations, made with the help of a few scattered pieces of information. The wood input for example was determined on the basis of the percent of the firms that are wood makers. The amount from the leather industry is the residue of leather after calculating the shoes and export leather accounts.

Sector 20. Miscellaneous Manufacturing

Perfumes and Cosmetics

Inputs		Outputs	
Imports	332.4	To Consumption	659.5
Transport	42.7		443.6
Service	50.2	Value Added	215.9
Miscellaneous	3.2		
Trade	1.6		
Electricity	2.5		
Metallic Manufacturing	6.2		
Transport Equipment	4.5		
Construction	1.1		
Water	.3		
	443.6		

This account was taken directly from records of the three firms in Kano, and one in Lagos. It was assumed that these constitute the entire industry. The only complication encountered was that one of the firms also makes confectionery and so the breakdown between the two industries may not be entirely accurate. As usual, standard distributions were used for items of imports, administration, repairs, etc.

Miscellaneous Textiles and Apparel

Inputs		Outputs	
Imports	9.0	To Consumption	21.0
Trade	1.0		11.8
Service	1.8	Value Added	9.2
	11.8		

This is a collection of a few miscellaneous operations such as cargo slings, badges, and embroidery that fit neither with textiles nor tailors, nor singlets. The figures are based on over-all figures, and in general are rather rough.

Umbrellas

Inputs		Outputs	
Imports	49.8	To Consumption	80.0
Transport	1.2		58.4
Service	4.2	Value Added	21.6
Trade	3.2		
	58.4		

The data for this account was fairly impressionistic, being based on the assumed outputs of three factories in Lagos and a factory in Onitsha. Here we knew the output price and the price of the materials.

Tarpaulins

Inputs		Outputs	
Imports	125.8	To Consumption	134.7
Transport	10.7	To Service	67.3
Electricity	.5		201.5
Transport Equipment	.2		143.5
Metallic Manufacturing	1.3	Value Added	58.0
Service	2.7		
Miscellaneous	1.3		
Trade	1.0		
	143.5		

Here we assumed that the entire output went to the service industry, because tarpaulins seemed to be most often used for covering goods awaiting shipment. Possibly some of the output should have gone to transport for use on lorries carrying goods and maybe a small amount to consumption in private use, especially in Lagos. However, there was no real method of obtaining these breakdowns, thus in the absence of definite information the output was assigned to the largest expected user.

The input accounts are quite accurate as they were derived from the statements of the two firms in the industry as well as some direct observational information. The usual breakdowns of administration, etc., were used.

Map Making

Inputs		Outputs	
From Textiles	2.4	To Consumption	14.0
Imports	6.7		11.4
Utilities	.6	Value Added	2.6
Service	1.1		
Transport	.6		
	11.4		

An account from the Federal Map Unit of the Ministry of Works and Surveys. The revenue figure is exact, the input data is rather diffuse as it appears in accounts in combination with a number of other activities of the Ministry.

Mattress Making

Inputs		Outputs	
Textiles	11.9	Output to Consumption	192.5
Imports	61.1		117.4
Transport	8.6	Value Added	75.1
Trade	8.6		
Service	8.6		
Agriculture	14.3		
Electricity	2.9		
Metallic Manufacturing (Repair)	1.4		
	117.4		

This account was made with the use of one formal account and several small summary accounts. The costs were then used on the small industry projection for the mattress category, and the above figures were obtained. As usual the import figure has a transport, trade, and service component. The agricultural input is for the stuffing of the mattresses, usually coir, grass, or other suitable products.

Miscellaneous Industries - Small

Inputs		Outputs	
Trade	20.3	To Export	6.5
Service	20.3	To Trade	148.6
Transport	43.9	To Consumption	499.8
Imports	152.1	To Service	413.3
From Forestry and Livestock	101.4		1,068.2
	338.0		338.0
		Value Added	730.2

This account is probably understated. It is based on a projection of the Eastern Region studies. It includes: radio repair, signs, musical instruments, brush making, rafia work, typewriter repair, and clock repair. The output to trade is painted signs, the input from forestry and livestock is for wood for instruments, gut and thong for instruments, materials for brushes and rafia and wood for signs. The over-all figures are relatively good especially the relationship between the over-all input and output figure, but the breakdown of inputs is rather arbitrary. The output to service is for musical instruments to entertainment.

Residual Accounts

Having calculated explicitly sectors 1-12, 14, 16-20, we found ourselves with a rather amorphous residual supposedly destined for sectors 13 and 15 (trade and service). The first step was to identify all of the residual explicitly mentioned in Okigbo. Doing this we found that Domestic Service was valued at the same price to the consumer as its value-added figure, thus it was a straight transfer from service sector to consumption without any inputs. We also found a figure for clearing of land and this we placed directly into the final investment sector, as it was assumed to be all hand labor and thus entirely value-added. Also we found a figure for ownership of buildings at consumption cost and at value-added. The difference we assumed to be an input of repairs and thus a transfer from sector 14 to sector 15.*

Our final residual then consisted of trade and service accounts. From Okigbo and from a projection of trading with the volume of imports, we had an indication that the total value-added of this residual ought to be at least £ 140 million. Then, we approached the problem from the known inputs and outputs. We found that we had already on our accounts some £ 160 million in sales, not counting the transfers from trade to service and vice versa. Looking at the inputs, and making guesses for the inputs of utilities, tailoring (for uniforms), building repairs, and miscellaneous inputs, we arrived at inputs of about 7.5 million. Next we looked at possible imports and decided that office supplies, photo supplies, bags and wrapping paper, and plate glass windows were the most likely. Thus our final input bill amounted to some £ 9 million, leaving about £ 150 million in value-added.

Then we came to the problem of the hazy division between service and trade. In this study we wanted to confine trade to the actual buying and selling of goods, but not to include such activities as the buying of crops for the Marketing Boards as this is essentially a service to agriculture. Also in service are such things as agency work, advertizing, freight forwarding, and promotional activities. Small business, such as photography and barbering, we considered to be service. Finally, there are the normal service industries, such as the professions, the missions, and the banks. This division between the two sectors seems rather arbitrary and probably does not coincide directly with our practice of assigning 10% of the retail cost of a product each to service and to trade, nor with the breakdowns contained in our standard distributions. For the sake of accuracy the two sectors should have been combined, however, we left them separate with the definite statement that we did not consider the separation to be particularly accurate.

Finally, we note that our intermediate flow accounts contain all the centers of value-added in the economy except the government, final investment, and the Marketing Boards.

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* At this point we might mention that these figures are for the year 1957 and that the E.P.U. projections of Okigbo's data did not see fit to make any increase in them. Thus we have not changed the values. However, if such a refinement on data is desired, ownership of buildings should be projected with the cement supply and domestic service with the value of personal consumption expenses.

CHAPTER VIII

NATIONAL INCOME ACCOUNTS

Table I presents the National Income accounts that are associated with the individual flow accounts of Chapter VII. Their purpose in this work is for reference and comparison with other National Income Estimates in order that some idea may be gained of the agreement of our study with other methods of analysis of the Nigerian Economy.

The figures were obtained by the process of finding the difference between the sum of outputs and the sum of inputs for the particular industry in question. The figure thus arrived at represents the contribution of the primary factors of production; labor, rents, interest, and management. The sum total of these figures for the whole economy produces a gross domestic product at factor cost.

By way of comparison we might note that the total presented here (£ 1,022,654.0) is very close to the estimate independently prepared by Dr. Stolper, of the Economic Planning Unit, (£ 1,025,000.0) for the same time period.

TABLE I

NIGERIAN NATIONAL ACCOUNTS-DOMESTIC PRODUCT

FISCAL YEAR 1959/60

Value-Added in Pounds Sterling times 1,000

Sector 1. Agriculture	
Groundnuts	25,564.0
Cocoa	19,579.7
Palm Fruit	10,725.0
Cotton	5,488.1
Rubber	7,631.1
Benniseed	829.1
Soyas	74.1
Shea Nuts	176.2
Palm Wine	5,000.0
Coffee, Copra, Ginger	1,097.6
Tobacco	357.0
Kola Nuts	5,308.3
Miscellaneous - Non Edible	32.6
Roots	202,000.0
Beans, etc.	28,800.0
Cereals	136,800.0
Bananas and Plantains	7,313.8
Miscellaneous Vegetables	576.3
Sub Total	457,350.9
Less General Inputs	1,903.2
Total Sector 1	455,447.7
Sector 2. Livestock, Fishing, Forestry	
Cattle	9,957.4
Sheep and Goats	9,383.6
Goats' Milk	6,600.0
Cows' Milk	12,023.1
Poultry and Eggs	10,180.0
Pigs	341.4
Miscellaneous Animal Products	246.1
Fishing	14,349.1
Forestry	30,263.8
Total Sector 2	93,344.5
Sector 3. Agricultural Processing	
Sawmills	1,869.4
Hand Sawyers	1,671.3
Rice Mills	13.3
Corn Mills	345.7
Tanning	341.1
Groundnut Processing	1,593.2
Cotton Ginning	418.7
Rubber Processing	3,281.6
Palm Products	18,628.2
Total Sector 3	28,162.5
Sector 4. Textiles	
Large Textiles	597.9
Weaving and Dyeing	650.6
Domestic Weaving	1,928.6
Total Sector 4	3,177.1
Sector 5. Clothing	
Domestic Tailoring	6,836.5
Tailors and Seamstresses	10,045.1
Singlets	118.6
Footwear	38.1
Rubber Shoes	486.9
Shoes - Repair	483.8
Total Sector 5	18,009.0
Sector 6. Drink and Tobacco	
Beer and Soft Drinks	2,514.3
Tobacco Manufacturing	6,189.4
Total Sector 6	8,703.7
Sector 7. Food	
Butter	156.8
Meat Canning and Dried Milk	9.4
Miscellaneous Foods	89.7
Margarine, Tea Blending, Fruit Canning	54.1
Pork	(134.1)
Baking	2,095.1
Small Food	4,522.8
Total Sector 7	6,793.8
Sector 8. Metallic Mining	5,046.5
Sector 9. Non-metallic Mining	
Petroleum Extraction	(93.9)
Sand, Stone, and Gravel	4,595.0
Coal	1,343.3
Total Sector 9	5,844.4

Sector 10. Chemicals	
Industrial Gases	5.5
Carbon Dioxide and Dry Ice	23.2
Bitumen	84.6
Soap - Large	1,194.1
Soap - Small	25.6
Lime	3.0
Vaccine	(24.7)
Total Sector 10	1,311.3
Sector 11. Transport	80,501.6
Sector 12. Utilities	
Electricity	2,866.9
Water	336.1
Total Sector 12	3,203.0
Sector 13. Trade	68,457.8
Sector 14. Construction	38,154.0
Sector 15. Service	
Domestic Service	5,500.0
Entertainment	1,086.7
Intrahousehold Service	10,000.0
Ownership of Buildings	10,300.0
Scrap	288.1
Other Services	82,724.6
Total Sector 15	109,899.4
Sector 16. Transport Equipment	
Vehicle Assembly	121.7
Transport Repair - Large	2,772.0
Transport Repair - Small	1,956.1
Boats	82.2
Total Sector 16	4,932.0
Sector 17. Non-metallic Mineral Products	
Tiles and Concrete Products	136.7
Cement and Ceramics	663.5
Drilling Mud	30.3
Total Sector 17	830.5
Sector 18. Metallic Manufacturing	
Large Metallic Manufacturing	1,009.5
Small Metallic Manufacturing	2,679.7
Bicycle Assembly	20.2
Total Sector 18	3,709.4
Sector 19. Products of Wood, Plastic, Paper, Leather, and Rubber	
Large Furniture	324.6
Small Furniture and Carpentry	5,684.3
Plastics and Foam Rubber	107.8
Tire Retreading	237.5
Printing, Publishing, and Stationery	1,951.2
Miscellaneous	989.1
Total Sector 19	9,294.5
Sector 20. Miscellaneous Manufacturing	
Perfumes	215.9
Miscellaneous Textiles	9.2
Umbrellas	21.6
Tarpaulins	58.0
Maps	2.6
Mattress Making	75.1
Miscellaneous - Small	730.2
Total Sector 20	1,112.6
Total All Sectors	945,935.2
Plus Marketing Boards	13,481.3
Plus Nonintermediate Value-added	17,237.5
Plus Government (Est.)	46,000.0
Total Gross Domestic Product at Factor Cost	1,022,654.0

CHAPTER IX

THE TECHNOLOGY MATRIX

In this chapter we present the next step in the analysis after the accounts of Chapter VIII. What we have done, as the title implies, is to aggregate the transfers and put them in a square matrix array, our first step on the way to the final matrix. This present array (Table II) shows the absolute amounts (in thousands of pounds) of transfers between sectors, and to and from the external areas of the economy. A look at Table II shows us, for example, that in our study year the food sector bought goods worth £ 2,142,000 (row 1, column 7) and so on for the other boxes in which figures occur. If we then divide this figure by the total output of the sector (which is, in fact, how we arrive at Table III), we see that, for instance, this purchase by food from agriculture represents about 10% of the total production value of the food sector. Our first figure in absolute pounds told us what went on in Nigeria in the specific year. The percent figure says the same thing, but in such a manner that we can now compare the Nigerian economy with other economies. (We find in doing so that this particular Food-Agriculture figure ranges from 12% to 39% in other economies[1] depending on the intensity of labour.) However, in these first two presentations we are tied to the time period and also to a neglect of high order effects. Therefore we invert the matrix to give us a coefficient which, if we believe the original input-output assumptions about production linearity, will be valid for any year and will include all the effects of a change in any sector. Thus it will be of far greater use in planning in the economy. We shall discuss the exact implications of these coefficients in the next chapter.

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[1] Chenery and Clark, pp. 216-223.

Before continuing, it would be wise to go over Table II, explaining exactly what it says. To begin with, the 20 x 20 matrix, distinguished by the numbered rows and columns, represents the intermediate area of the economy. A transfer recorded here is one of a product of the economy going into the making of another product of the economy rather than into consumption, investment, or export. The rows refer to producers, the columns to users. Thus taking column 7, the food industry, we see that it has inputs from agriculture, agricultural processing, livestock, non-metal mining (probably coal), transport, utilities, trade, construction, service, transport equipment, and sectors 18-20. Continuing below the 20 x 20 array we find a row labelled "imports," of which food uses about Ƀ 3.5 million, and a row for "total intermediate inputs" valued at about Ƀ 12 million. Next a "total input" row says that food takes in Ƀ 15.5 million worth of products, and an "output" row tells us that the sales of the food industry were some Ƀ 22.3 million. This output row is identical with the far righthand output column, the sum of each row having been placed beneath the column whose number was the same as the row number. Finally we have the difference between the output and the input, the value-added row. In our example, food had a value-added of Ƀ 6.8 million. The row sum of this value-added row gives us our estimate of Gross Domestic Product at factor cost (less government and marketing boards). Looking at the extension of the rows, we see that after the 20 columns, we encounter a column for the intermediate use sum of the row, a column for exports, columns for the other uses of the output, and finally the sum of the previous four columns, the total output of the industry. Thus food appears to have no intermediate uses, only Ƀ 140 thousand of exports, Ƀ 22.2 million worth of consumption, for a grand total output of some Ƀ 22.3 million.

Going back now to our purchase from agriculture by food, where did this figure come from? The answer appears if we go back to the separate accounts of Chapter VII. Here we find that most of the transfer (2,026.3) comes from the small food account. Some comes from the miscellaneous food manufacture account (108.0) and finally the rest (7.7) comes from the canning account. Proceeding in a like manner we can see how the other transactions on the table were constructed.

In order to give the reader some idea of what TableII has to say, and rather than go back to the previous chapter and reconstruct each transaction, we present below a brief summary of the contents of some of the more significant boxes. Each box we identify by its row and then its column, thus 1-7 means a transfer from sector 1 to sector 7 (this is, in fact, the £ 2,142.0 from agriculture to food discussed above).

Sector 1

3-1 cotton seed for planting, 11-1 transport on supplies, 13-1 15-1 trade and service on supplies.

Sector 2

3-2 livestock feed, 10-2 vaccine, 11-2, 13-2, 15-2 distribution margin on supplies.

Sector 3

1-3 palm fruit, rubber, groundnuts, cotton (the raw materials of the sector), 2-3 hides, skins, and timber (more raw materials), 12-3 electricity for the operation of the processing mills. 16-3 repair on the vehicles operated by the mills, particularly palm oil and rubber. 18-3 repair on the mill machinery.

Sector 4

1-4 cotton supplied to the cottage weaving industries. 3-4 ginned cotton supplied to the mills.

Sector 5

3-5 leather for shoes, 4-5 cloth supplied from the textile makers to the clothing makers. 18-5 repairs on sewing machines.

Sector 6

1-6 domestic tobacco to cigarettes.

Sector 7

1-7 rice and yams to food processing. 2-7 meat and milk, 3-7 vegetable oils for bread and margarine. 19-7 labels and wrappers for bread, and miscellaneous.

Sector 8

1-8 electricity for tin mining.

Sector 10

3-10 palm oil to soap. 18-10 metal drums for the bulking of bitumen.

Sector 11

9-11 coal for railways, 16-11 vehicle repair, 19-11 tire retreads.

Sector 12

3-12 wood chips used in the manufacture of electricity. 9-12 coal for electricity generation. 18-11 repairs on generating machinery.

Sector 13

5-13 estimate for uniforms worn by clerks employed in trading, 14-13 repairs on trading facilities.

Sector 14

2-14 timber in the round used in building, 3-14 sawn timber, 9-14 sand and gravel, 17-14 cement.

Sector 15

5-15 uniforms worn by service personnel, 19-15 printed matter, 20-15 musical instruments and tarpaulins (for crop storage).

Sector 16

3-16 wood for boats and lorry bodies.

Sector 17

9-17 limestone for cement making.

Sector 18

2-18 firewood for blacksmithing. 9-18 coal for metalworking forges.

Sector 19

2-19 wood in the round for carving, 3-19 sawn timber for furniture, unworked leather. 18-19 repairs, particularly on furniture-making machinery.

Sector 20

2-20 wood and animal products for instrument-making.

Thus we have a brief summary of the more important areas of Table II. Transport, trade, and service, which are the components of distribution are perhaps the most significant on the table, and occur in major quantities in almost every sector. Together they make up 26% of the GNP, and if we do not count the subsistence agriculture areas, the figure is nearly 50%. This conclusion is not altogether surprising, as Nigeria is still essentially a trading economy. What we have done in this study is to point out the extent of the trading involvement as well as to pinpoint other areas of the economy which are beginning to develop. It is these latter areas that will see the most growth in the future.

While TableII is adequate for accounting purposes, we must go further than this in order to produce a vehicle for analysis. Therefore, TableIII was calculated as explained above, by dividing each column figure by its corresponding row sum. Thus in our example of 1-7, we divide £ 2,142.0 by the row 7 sum (£ 22,333.1) and the resulting coefficient (.0959) is then placed in the 1-7 box of Table III. The purpose of this exercise is to convert all money values into input/output coefficients, which can then be mathematically operated upon to give us our inverted matrix. The coefficients in Table III have been multiplied by 10^4 to avoid writing leading zeros on the smaller figures; (this is standard input/output practice). It will be noted that these coefficients are termed a_{ij}, and refer back to our input/output equation that states $X_{ij} = a_{ij}X_j$,

which is the basic linearity equation upon which our analysis is based. In the next chapter, we will proceed with the inverted, or final, matrix.

Table II Transactions Matrix

Transfers in Thousands of Pounds Sterling

		1	2	3	4	5	6	7	8	9	10
1.	Agriculture	0.0	0.0	27730.7	2060.0	0.0	282.6	2142.0	0.0	0.0	7.6
2.	Livestock, Fishing, Forestry	10.0	0.0	5629.4	0.0	0.0	0.0	6729.2	35.7	55.0	8.2
3.	Agricultural Processing	94.9	583.6	0.0	363.4	241.4	0.0	100.9	0.0	0.0	601.4
4.	Textiles	0.0	0.0	0.0	0.0	6491.8	0.0	0.0	0.0	0.0	0.0
5.	Aparrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.	Drink and Tobacco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.	Food	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.	Metal Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.	Non-metal Mining	0.0	0.0	22.0	5.2	0.0	.6	1.6	19.4	0.0	24.9
10.	Chemicals	0.0	35.3	0.0	0.0	0.0	29.1	0.0	0.0	0.0	0.0
11.	Transport	283.2	536.9	6221.6	35.0	1273.2	182.7	1008.1	51.6	231.6	81.7
12.	Utilities	1.5	.2	597.7	76.8	21.7	71.6	42.2	236.2	74.0	42.9
13.	Trade	189.3	30.4	304.6	72.5	1456.0	60.1	630.7	62.4	128.2	31.8
14.	Construction	0.0	.4	69.5	9.8	.5	8.3	17.8	19.2	91.0	16.9
15.	Service	421.3	68.0	1557.6	92.4	772.0	341.6	1056.3	126.7	58.4	214.5
16.	Transport Equipment	0.0	.5	128.8	1.2	.4	9.3	19.7	19.3	16.0	9.8
17.	Non-metallic Mineral Mfg.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0
18.	Metallic Manufacturing	0.0	0.0	142.8	45.9	741.8	57.8	79.8	27.1	22.0	181.5
19.	Wood, Leather, Paper, etc.	0.0	0.0	50.3	6.4	4.7	47.1	168.3	15.6	26.0	37.2
20.	Miscellaneous	0.0	0.0	25.1	3.2	2.4	23.5	65.4	7.8	13.0	15.2
	Total Intermediate Inputs	1000.2	1255.3	42480.1	2771.6	11005.9	1114.3	12062.0	621.0	765.2	1273.6
	Imports	2070.6	4843.5	2135.3	619.7	4567.9	3780.7	3477.3	397.8	3114.2	826.7
	Total Inputs	3070.8	6098.8	44615.4	3391.3	15573.8	4895.0	15539.3	1018.8	3879.4	2100.3
	Total Outputs	458518.5	99443.3	72777.8	6568.4	33582.8	13598.7	22333.1	6065.3	9723.8	3411.6
	Value Added	455447.7	93344.5	28162.4	3177.1	18009.0	8703.7	6793.8	5046.5	5844.4	1311.3

		11	12	13	14	15	16	17	18	19	20
1.	Agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3
2.	Livestock, Fishing, Forestry	0.0	0.0	0.0	1700.8	0.0	5.2	.4	174.6	211.3	101.4
3.	Agricultural Processing	0.0	205.0	0.0	6574.3	0.0	209.3	0.0	0.0	5182.0	0.0
4.	Textiles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3
5.	Aparrel	0.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
6.	Drink and Tobacco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.	Food	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.	Metal Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0
9.	Non-metal Mining	813.9	430.0	0.0	4568.0	27.6	9.3	225.7	30.7	0.0	0.0
10.	Chemicals	4.3	0.0	0.0	740.1	0.0	0.0	0.0	17.7	0.0	0.0
11.	Transport	0.0	296.7	1699.7	7181.0	1341.4	245.3	59.4	356.3	652.9	107.7
12.	Utilities	0.0	0.0	0.0	121.0	715.9	107.2	134.5	88.0	111.1	6.8
13.	Trade	1647.2	104.7	0.0	6072.0	2863.5	237.4	10.1	411.4	418.3	35.7
14.	Construction	0.0	19.2	317.4	0.0	1961.3	20.0	1.2	16.0	13.0	1.1
15.	Service	2958.7	99.6	2198.8	934.0	0.0	355.3	48.0	607.6	695.9	88.9
16.	Transport Equipment	6158.8	0.0	0.0	217.0	0.0	0.0	2.1	3.7	7.2	4.7
17.	Non-metallic Mineral Mfg.	0.0	0.0	0.0	1372.9	0.0	0.0	0.0	0.0	0.0	0.0
18.	Metallic Manufacturing	109.2	363.0	160.4	235.0	180.3	3.4	9.7	0.0	103.5	10.0
19.	Wood, Leather, Paper, etc.	748.8	12.7	320.8	1956.9	1129.2	5.7	7.1	11.4	0.0	2.3
20.	Miscellaneous	109.1	6.4	309.0	0.0	795.2	2.8	3.5	5.7	8.0	0.0
	Total Intermediate Inputs	12550.0	1537.3	5106.1	31673.0	9114.4	1200.9	501.7	1765.1	7403.2	387.2
	Imports	11867.8	738.9	820.0	20673.0	3211.6	2559.5	123.7	4507.0	3477.1	736.9
	Total Inputs	24417.8	2276.2	5926.1	52346.0	12326.0	3760.4	625.4	6272.1	10880.3	1124.1
	Total Outputs	104919.4	5479.2	74383.9	90500.0	122225.4	8692.4	1455.9	9981.5	20174.8	2236.7
	Value Added	80501.6	3203.0	68457.8	38154.0	109899.4	4932.0	830.5	3709.4	9294.5	1112.6

	I.	II.	III.	IV.	V.=
		Final Demand			I.+II.+III.+IV.
	Total Intermediate Demand	Investment	Exports	Consumption	Total Demand
1. Agriculture	33237.2	0.0	40476.8	385804.5	458518.5
2. Livestock, Fishing, Forestry	14661.2	0.0	6190.9	78591.2	99443.3
3. Agricultural Processing	14156.2	0.0	46640.0	11981.6	72777.8
4. Textiles	6506.1	0.0	62.3	0.0	6568.4
5. Aparrel	200.0	0.0	0.0	33382.8	33582.8
6. Drink and Tobacco	0.0	0.0	89.5	13509.2	13598.7
7. Food	0.0	0.0	139.7	22193.4	22333.1
8. Metal Mining	12.0	0.0	6053.3	0.0	6065.3
9. Non-metal Mining	6178.9	0.0	3519.6	25.3	9723.8
10. Chemicals	826.5	0.0	151.5	2433.6	3411.6
11. Transport	21846.0	4273.9	11211.3	67588.2	104919.4
12. Utilities	2449.3	0.0	0.0	3029.9	5479.2
13. Trade	14796.1	3029.8	1197.6	55360.4	74383.9
14. Construction	2582.6	85000.0	0.0	2917.4	90500.0
15. Services	12695.6	4977.7	8715.0	95837.1	122225.4
16. Transport Equipment	6598.5	1293.9	0.0	800.0	8692.4
17. Non-Metallic Mineral	1422.9	0.0	17.4	15.6	1455.9
18. Metallic Manufacturing	2473.2	1737.2	7.5	5763.6	9981.5
19. Wood, Leather, Paper, Rubber, Plastic	4550.5	0.0	0.0	15624.3	20174.8
20. Miscellaneous	1395.3	0.0	6.5	834.9	2236.7
Total Outputs (Sum of 1-20)	145588.1	100312.5	124478.9	795693.0	1166072.5
Consumption of Intermediate goods				795693.0	
Consumption of Imports				119859.4	
Investment in Intermediate goods				100312.5	
Investment in Imports				30338.0	
Investment Value added-final				17237.9	
Trade Balance (E-I)				(27648.1)	
Gross National Product				1035792.3	

Table III . Technology Matrix (A x 10^4)

		1	2	3	4	5	6	7	8	9	10
1.	Agriculture	--		3810	3136		208	959			22
2.	Livestock, Fishing, Forestry	+	--	774				3013	59	57	24
3.	Agricultural Processing	2	59	--	553	72		45			1763
4.	Textiles				--	1933					
5.	Aparrel					--					
6.	Drink and Tobacco						--				
7.	Food							--			
8.	Metal Mining								--		
9.	Mon-metal Mining			3	8		+	+	32	--	73
10.	Chemicals		4				21				--
11.	Transport	6	54	855	53	379	134	451	85	238	239
12.	Utilities	+	+	82	117	6	53	19	389	76	126
13.	Trade	4	3	42	111	434	44	282	103	132	93
14.	Construction		+	10	15	+	6	8	32	94	50
15.	Service	9	7	214	141	230	251	473	209	60	629
16.	Transport Equipment		+	18	2	+	7	9	32	16	29
17.	Non-metallic Mineral Mfg.									51	
18.	Metallic Manufacturing			20	70	221	43	36	45	23	32
19.	Wood, Leather, Paper, etc.			7	10	1	35	75	26	27	109
20.	Miscellaneous			3	5	+	17	29	13	13	45

+ = small positive transaction, a_{ij} 10^{-4}

	11	12	13	14	15	16	17	18	19	20
1. Agriculture										64
2. Livestock, Fishing, Forestry				188		6	3	175	105	453
3. Agricultural Processing		374		726		241			2569	
4. Textiles										64
5. Aparrel			13		8					
6. Drink and Tobacco										
7. Food										
8. Metal Mining								12		
9. Non-metal Mining	78	785		505	2	11	1550	31		
10. Chemicals	+			82				18		
11. Transport	--	542	229	793	110	282	408	357	324	482
12. Utilities		--		13	59	123	924	88	55	30
13. Trade	157	191	--	671	234	273	69	442	207	160
14. Construction		35	43	--	160	23	8	16	6	5
15. Service	282	182	296	103	--	409	330	609	345	397
16. Transport Equipment	587			24		--	14	4	4	21
17. Non-metallic Mineral Mfg.				152			--			
18. Metallic Manufacturing	10	663	22	26	15	4	67	--	51	45
19. Wood, Leather, Paper, etc.	71	23	43	216	92	7	49	11	--	10
20. Miscellaneous	10	12	42		65	3	24	6	4	--

CHAPTER X

THE INVERTED MATRIX

Having gathered the data, transformed it into usable form, set up the transactions matrix and then produced the technology matrix, we are now ready to proceed to the final stage of our analysis, the inverted matrix. Our technology matrix is able to tell us the immediate effects of a change in any sector, provided we express this in terms of change in total output - which includes both the output to the intermediate and the final sectors. This type of analysis is probably quite valid for a sector that has little or no intermediate connections, and perhaps in a less developed economy it would remain valid for all sectors within the limits of data error. However, where there is connection, such an analysis ignores the effects that changes in other sectors, arising from a change in a given sector, may have upon that sector. Typically such additional effects amount to several percent, and become quite significant when the analysis is used in planning.

The inversion itself is a mathematical process involving any one of several methods. If the matrix is small this can be done by hand, in most cases the operation is performed on a computer where it takes only a few minutes. Such was the case with the present analysis.[1]

Table IV presents the final inverted matrix. It should be evident that each coefficient is slightly higher than the corresponding figure in Table III; this difference is the sumtotal of the higher order effects that we discussed in Chapter III. The figures along the main diagonal are considerably higher, but

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[1] The author wishes to thank C. H. Willson of the M. I. T. computer facility for his help in preparing the programing required to calculate and invert the matrix.

this is due to the fact that, for computational reasons, the base point for these elements in Table III was zero, while in Table IV it is one.

Looking again at sector 7, we can trace the changes that have occurred. The transfers from 1 to 7 have risen from .0959 to .0993. This means that for every ten thousand units of output by sector 7, sector one will have to produce 993 units, of which 959 will be direct demand and 34 will be demand derived from other sectors whose own output goes in part directly to sector seven. If we were to consider the static system, then there would be no need to identify these additional 34 units, as they would be implicit in the transfers from sector one to the other sectors. However, the utility of the input-output analysis lies in its ability to predict the total effect of a change in a particular area of the economy. When we consider a single change, holding the rest of the economy static, then we not only have direct effects, but also derived effects, changes that can be attributed to the original change. Thus what we are talking about is the effect of marginal or additional production of one area on the whole system. In our sector 7 example we are talking about the effects of increasing production by 10,000 units rather than the effects of a total output of that amount. Thus if sector one, knowing of a 10,000 unit increase in sector 7, puts out only 959 units, it will find itself 34 units short; sector 2, producing 3,013 units, will find itself 11 units short; sector 11, producing 451 units, will find itself 48 units short; etc. This knowledge of the additional units that will have to be produced becomes particularly useful in planning for an economy, notably so where certain sectors have high capital needs or high import coefficients. A planner may decide to allocate on a very strict basis the output of a critical industry (for example, steel), and he may do this according to the technological coefficients - i.e. the technology [A] matrix. This will

be sufficient as long as it is done with a total economy allocation. Now suppose he plans a second plant in this industry and assigns its output to certain selected industries. Unless he does this according to the inverted matrix, taking into account the higher order effects, serious misallocation may occur. In the first place, there will be an excess of demand over supply, and if prices are fixed, underproduction and failure to meet goals will result. Secondly, unforeseen import demands may take place causing either underproduction, smuggling, or excess drain of exchange reserves.

The number of potential applications of this type of total effect analysis are very large and varied. We have only covered a few of the more conventional ones. Our purpose is to point out the uses of such analysis and also to show that the greater the planning of the economy, the more essential it becomes for such a study to be undertaken and used.

TABLE IV Inverse Matrix ($I-A^{-1}$)

		1	2	3	4	5	6	7	8	9	10
1.	Agriculture	1.0001	.0023	.3816	.3351	.0677	.0215	.0993	.0010	.0008	.0712
2.	Livestock, Fishing, Forestry	.0000	1.0005	.0776	.0046	.0019	.0004	.3024	.0064	.0062	.0179
3.	Agricultural Processing	.0002	.0060	1.0016	.0564	.0185	.0017	.0089	.0027	.0020	.1808
4.	Textiles	.0000	.0000	.0000	1.0000	.1933	.0000	.0000	.0000	.0000	.0000
5.	Aparrel	.0000	.0000	.0000	.0000	1.0001	.0000	.0000	.0000	.0000	.0000
6.	Drink and Tobacco	.0000	.0000	.0000	.0000	.0000	1.0000	.0000	.0000	.0000	.0000
7.	Food	.0000	.0000	.0000	.0000	.0000	.0000	1.0000	.0000	.0000	.0000
8.	Metal Mining	.0000	.0000	.0000	.0000	.0000	.0000	.0000	1.0000	.0000	.0000
9.	Non-metal Mining	.0000	.0000	.0018	.0020	.0009	.0007	.0008	.0066	1.0022	.0094
10.	Chemicals	.0000	.0004	.0000	.0000	.0000	.0022	.0001	.0000	.0000	1.0002
11.	Transport	.0007	.0060	.0877	.0121	.0433	.0149	.0499	.0125	.0263	.0451
12.	Utilities	.0000	.0000	.0085	.0124	.0035	.0056	.0024	.0393	.0083	.0152
13.	Trade	.0004	.0005	.0070	.0128	.0483	.0059	.0311	.0127	.0150	.0163
14.	Construction	.0000	.0000	.0015	.0020	.0011	.0011	.0018	.0038	.0096	.0066
15.	Service	.0010	.0010	.0252	.0172	.0305	.0266	.0510	.0232	.0082	.0732
16.	Transport Equipment	.0000	.0004	.0069	.0010	.0026	.0016	.0038	.0039	.0032	.0059
17.	Non-metallic Mineral Mfg.	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0053	.0001
18.	Metallic Manufacturing	.0000	.0000	.0027	.0080	.0239	.0048	.0040	.0072	.0030	.0549
19.	Wood, Leather, Paper, etc.	.0000	.0000	.0016	.0014	.0012	.0039	.0086	.0031	.0033	.0124
20.	Miscellaneous	.0000	.0000	.0006	.0007	.0006	.0020	.0035	.0016	.0015	.0052

		11	12	13	14	15	16	17	18	19	20
1.	Agriculture	.0013	.0148	.0008	.0308	.0016	.0096	.0021	.0007	.0983	.0090
2.	Livestock, Fishing, Forestry	.0005	.0048	.0005	.0257	.0011	.9927	.0021	.0178	.0306	.0456
3.	Agricultural Processing	.0035	.0389	.0017	.0807	.0040	.0253	.0056	.0017	.2579	.0015
4.	Textiles	.0000	.0000	.0003	.0000	.0002	.0000	.0000	.0000	.0000	.0064
5.	Aparrel	.0000	.0000	.0014	.0001	.0009	.0000	.0000	.0001	.0000	.0000
6.	Drink and Tobacco	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
7.	Food	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
8.	Metal Mining	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0012	.0000	.0000
9.	Non-metal Mining	.0080	.0797	.0005	.0541	.0017	.0025	.1632	.0043	.0013	.0008
10.	Chemicals	.0000	.0002	.0000	.0082	.0001	.0000	.0000	.0018	.0000	.0000
11.	Transport	1.0034	.0635	.0243	.0919	.0144	.0328	.0523	.0389	.0567	.0502
12.	Utilities	.0011	1.0018	.0003	.0043	.0061	.0129	.0942	.0094	.0080	.0035
13.	Trade	.0185	.0255	1.0018	.0713	.0254	.0296	.0138	.0470	.0245	.0184
14.	Construction	.0008	.0049	.0048	1.0013	.0162	.0032	.0034	.0029	.0018	.0013
15.	Service	.0318	.0266	.0310	.0196	1.0023	.0438	.0391	.0641	.0433	.0425
16.	Transport Equipment	.0589	.0040	.0015	.0081	.0009	1.0020	.0048	.0027	.0042	.0051
17.	Non-metallic Mineral Mfg.	.0000	.0005	.0000	.0155	.0003	.0000	1.0009	.0000	.0000	.0000
18.	Metallic Manufacturing	.0013	.0668	.0023	.0041	.0021	.0015	.0135	1.0010	.0064	.0049
19.	Wood, Leather, Paper, etc.	.0076	.0036	.0049	.0232	.0099	.0016	.0064	.0023	1.0012	.0019
20.	Miscellaneous	.0014	.0017	.0044	.0007	.0067	.0008	.0031	.0013	.0009	1.0004

CHAPTER XI

CONCLUSIONS

Thus we have presented the input-output analysis of the Nigerian Economy for the year 1959-60. We started with the ideas behind the work, proceeded through the sources and definitions, presented at length the flow accounts, and finally arrived at the matrices. It has been our purpose to show what an input-output analysis involves and how it is arrived at in order that our first attempt to apply the technique to Nigeria may be improved and enlarged upon. We have tried to point out the weak points not only in the analysis but also in the available data, and we hope that our work will become a basis for future and better applications of this method of economic analysis in the process of planning and development in Nigeria.

The uses of an analysis such as this one are many and diverse. Perhaps the most important comes from the fact that among developed nations, the various input-output coefficients tend to be the same, thus a direct measurement of the extent of development of a country may be had by comparing its figures with those of countries such as the United States and Great Britain.[1] In addition time series presentations of the comparisons will show rates of development. On a more direct and practical level the analysis can be used to show compositions of demand for any product, import dependence, and labor dependence of any sector, capital requirements, etc.[2] The feature of the analysis that gives

[1] An excellent description of this process appears in The Structure of Development by Wassily Leontief, Scientific American, Vol. 209, number 3, September 1963, pp. 148-166.

[2] Stone, R. Input-output and National Accounts, OEEC, Paris, June 1961. pp. 169-190. This is a practical demonstration of the immediate uses of the input-output matrices.

it this versatility is that it not only shows how much, but also how. That is to say input-output analysis demonstrates the interrelationships of all the different parts of the economy and enables us to determine not only the direct results of any economic decision, but also the indirect ones. Armed with an efficient analysis, economic planners can see in detail the exact effects of their several courses of action, and thus choose solutions that minimize scarce inputs, costs, or other economic and non-economic factors. Indeed, the relatively new technique of input-output analysis is becoming an essential tool in the task of planning development and the search for methods to describe more accurately the process of economics.